543
The DDT Story

Keller, E.; Chemistry

Part of Giddings, J.C. (Ed.), Monroe, M.B. (Ed.), Our Chemical Environment, Canfield Press, San Francisco, CA, (p. 173-179), 367p.; 1972

DDT; INSECTICIDES; PESTICIDES; RESIDUES; CHLORINATED HYDROCARBONS; TYPHUS; LICE; MALARIA; PERSISTENCE; BIRDS; FISH; FISH KILLS; ENDRIN; RESISTANT SPECIES; SUSPENDED PARTICLES; ADSORPTION; BIOACCUMULATION; SEDIMENTS; FOOD CHAINS; PLANKTONS; KRILL; PENGUINS; CONCENTRATION FACTOR; OYSTERS; GREBES; SALMON; HERRING; WHITEFISH; EGGS; EGGSHELL THICKNESS; ROBINS; EARTHWORMS; WORMS; VEGETABLES; PEANUTS; FAT; ENZYME; MUTAGENS; HORMONES; LEGISLATION

DDT, a chlorinated hydrocarbon pesticide, was developed by Paul Mueller (Nobel prize in 1948 for its discovery) as an insecticide shortly before world war 2. The ingredients of previous insecticides (arsenic, copper, lead) were needed for war purposes, and this new compound was cheap and marvelously effective in combating typhus and malaria. It was soon used in huge quantities (U.S. production 167 million pounds in 1962) as an anti-louse product (mixed with talcum powder), and was sprayed widely to control mosquitos. But resistant insect species began to appear. Also in 1962 Rachel Carson's book SILENT SPRING was published, warning against the hazards to birds and fish. Fish kills occurred in the lower Mississippi in 1963 due to endrin. It was found that DDT accumulates in fatty tissues and that it was quite persistent in many soils (up to 50 percent remaining after 10 years). It was found that DDT was spread over the environment and was concentrated in some food chains. The effects on birds in some areas were particularly serious: it interfered with the calcium metabolism and led to thin eggshells and consequent reproductive failure when the eggs broke before hatching. DDT has been found in human fat at 3-20 plus ppm depending on the country (U.S. - 12ppm). There is some evidence that it may affect enzyme and hormone systems, and may be a mutagen. In November, 1969, Robert Finch, Secretary of HEW called for elimination in the U.S. within 2 years of all uses of DDT and DDD except those essential to human health.

544
Analysis of Decomposition Products of Pesticides

Kennedy, M.V.; Stojanovic, B.J.; Shuman, F.L., Jr.

J. Agric. Food Chem. 20 (2), 1972, 341-343.

RESIDUES; GAS CHROMATOGRAPHY; INFRARED SPECTRA; ELECTRON CAPTURE; HYDROGEN; FLAME IONIZATION; THERMAL CONDUCTIVITY; CARBON DIOXIDE; CARBON MONOXIDE; NITROGEN OXIDES; HYDROCHLORIC ACID; ANALYSIS; DECOMPOSITION; PESTICIDES

545
Translocation and Aftereffect of Herbicides

Khalilov, I.M.; Tadzh. S.-Kh. Inst., Dushanbe, USSR

Dokl. Akad. Nauk Tadzh. SSR(DANTAL) 1973, 16(2) 56-9; 1973

TRANSLOCATION; HERBICIDES; SOILS; COTORAN; NITROFOR; PLANAVIN; CUCUMBERS; BARLEY; GERMINATION; HERBAN; PLANTS; BIOINDICATORS; PERSISTENCE

When cotoran was applied to the surface of a 24-cm soil sample of cucumber plantings, 50% of the herbicide settled in the top 7 cm and 25% in the bottom 10 cm the cucumber plants were largely destroyed. Cotoran or nitrofor applied in optimal doses retained residual activity for 4-5 months during which time the herbicide reduced the germination rate of barley plants. Later the herbicides accelerated barley growth and increased barley green mass. Herban, planavin, and preparations 456 and 613 had no residual toxicity and stimulated barley growth. All the herbicides studied were completely inactivated within the 1st year after application.

546
Interaction of Bipyridylium Herbicides with Organoclay Complex

Khan, S.U.; Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

J. Soil Sci.(JSSCAH), 24(2), 244-8; 1973

HERBICIDES; ADSORPTION; ORGANOCLAYS; PARAQUAT; DIQUAT; BIPYRIDYLIUM; CHARGE-TRANSFER; CLAY; HUMUS; ABSORPTION; BIPYRIDYLIUM; INFRARED SPECTROSCOPY

Paraquat was adsorbed in greater amounts than diquat by an organoclay complex. Infrared studies indicated the existence of charge-transfer complexes between paraquat or diquat and the organoclay complex. Upon interaction with clay, organic matter may facilitate the adsorption of paraquat or diquat on clay minerals in soil.

547
Adsorption of Pesticide by Humic Substances; A Review

Khan, S.U.; Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

Environ. Lett.(EVLTAX), 3(1), 1-12; 1972

REVIEW; PESTICIDES; ADSORPTION MECHANISMS; MECHANISM; ADSORPTION

548
Interaction of Humic Acid with Chlorinated Phenoxyacetic and Benzoic Acids

Khan, S.U.; Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

Environ. Lett.(EVLTAX), 4(2), 141-8; 1972

PHENOXYACETATE ACIDS; HERBICIDES; HUMIC ACID; SOILS; RETENTION; BENZOATES; ADSORPTION

549
Interaction of S-2,3,3-Trichloroallyl N,N-Diisopropylthiolcarbamate (Triallate) with Montmorillonite

Khan, S.U.; Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

J. Environ. Qual.(JEVQAA), 2(3), 415-17; 1973

TRIALLATE; PERSISTENCE; MONTMORILLONITE; HERBICIDES; CATIONS; OXYGEN; WATER; CLAY; DISPLACEMENT; CARBONYL

Triallate coordination to exchangeable cations on montmorillonite clay occurred by means of the oxygen atom of the carbonyl group of triallate. Triallate-montmorillonite complexes were stable on heating to 50 degrees for 15 days, but when shaken with distilled water, the herbicide was completely displaced from the clay.

550
Equilibrium and Kinetic Studies of the Adsorption of 2,4-D and Picloram on Humic Acid

Khan, S.U.; Res. Sta., Agr. Can., Regina, Saskatchewan, Canada

Can. J. Soil Sci., 53(4), 429-434; 1973

EQUILIBRIUM; ADSORPTION; 2,4-D; PICLORAM; RATE CONSTANTS; ACTIVATION; HERBICIDES; HUMIC ACID; DIFFUSION; INTRAPARTICLE DIFFUSION; KINETICS; ADSORPTION

Equilibrium and kinetic studies of the adsorption of 2,4-D and picloram on a humic acid have been made. The equilibrium data followed the Freundlich-type isotherm. Rate constants, activation energies, heats of activation, and entropies of activation were calculated for the adsorption of the two herbicides on humic acid. The rate data indicated a physical type of adsorption. In the overall adsorption process the rate-limiting step for the initial period was shown to be the diffusion of the herbicide molecules to the surface of humic acid. However, the rate-limiting process at longer time intervals was interpreted to be intraparticle diffusion of the herbicide molecules into the interior of the humic acid particles. (25 references)

551
Interaction of Humic Substances with Bipyridylium Herbicides

Khan, S.U.; Res. Stn., Agric. Dep. Canada, Regina, Saskatchewan, Canada

Can. J. Soil Sci.(CJSSAR) 1973, 53(2) 199-204; 1973

BIPYRIDYLIUM; HERBICIDES; SOILS; DIQUAT; PARAQUAT; HUMIC ACID; FULVIC ACID; BINDING; GEL FILTRATION; CHARGE-TRANSFER; ANALYSIS; WATER; INFRARED SPECTROSCOPY

When applied to soils and water, bipyridylium herbicides form charge-transfer complexes with humic substances. The binding for complexing of diquat and paraquat by humic and fulvic acids was studied by gel-filtration. Paraquat was complexed by humic compounds to a greater extent than was diquat. Both herbicides were complexed to a higher degree by humic acids than by fulvic acids. As shown by infrared spectroscopy charge-transfer complexes vare formed between the herbicides and humic compounds.

552
Dynamics of the Residue Content of DDT and Hexachlorocyclohexane in Soil, Cotton Plants, and Motley Grass

Khodzhaniyazov, A.; USSR

Tr., Vses. Nauch.-Issled. Inst. Vet. Sanit.(TIVSAI) 1970, 37, 211-18; 1970

DDT; RESIDUES; COTTON; PLANT; HEXACHLOROCYCLOHEXENE; HCH; PESTICIDE; LEAVES; VAPORIZATION; GRASSES; IRRIGATION

DDT and HCH disappeared rapidly from the soil of the turkmen ssr owing to vaporization and washout, expecially in irrigated fields. The insecticide resideues were higher in soils with high mineral contents than in light soils, but they did not exceed 5 mg/kg (DDT) or 0.046 mg/kg (HCH). The pesticide residues were highest in the cotton plant leaves (1.08-1.15 mg/kg), somewhat lower in the stems and interrow grasses, and lowest in the soils at 2 months after harvest.

553
Determination of Residual Amounts of Soil Herbicides in the Soil and Aurantiaceae

Khubutiya, D.A.; Gigineishvili, A.A.; Nauchno-Issled. Inst. Zashch. Rast., Tbilisi, USSR

Khim. Sel. Khoz.(KSKZAM)., 9(12), 924-8; 1971

HERBICIDES; RESIDUES; SOILS; MONURON; DIURON; ATRAZINE; SIMAZINE; LEAVES; ORANGES; LEMONS; MANDARINS; CITRUS TREES; CITRUS

Monuron, Diuron, and Simazine applied in the early spring at 10, 13.5 or 16 kg/ha in mandarin, orange, and lemon tree plantations, penetrated 40 cm deep into the soil during the first 2 months and were detected in leaves in amounts of 0.04-0.60 mg/kg at 13.5 and 16 kg/ha. Traces of Monuron, Diuron and atrazine were detected only in the skin of unripe fruits but not in the ripe fruits. The herbicides were washed out of alluvial-sandy soils faster than from brown forest soils. No accumulation of manuron applied at 10 kg/ha for several years was observed.

554
Persistence of Systemic Insecticides in Plants

Khurana, A.D.; Dep. Entomol., Haryana Agric. Univ., Hissar, India

Pesticides(PSTDAW), 5(12), 51-6; 1971

REVIEW; INSECTICIDES; PERSISTENCE; SOILS; SEED APPLICATION

A review with 43 references on soil, seed, and foliar application of systemic insecticides, and on their persistence. The most important systemic insecticides are listed.

555
Persistence of DDT in Orchard Soils

Kiigemagi, U.; Terriere, L.C.; Oregon State University, Corvallis, USA

Bull. Environ. Contam. Toxicol., 7(6), 348-352

LEACHING; PERSISTENCE; DDT; SOILS; ORCHARDS; RESIDUES

Analyses of soil samples from 2 orchards, which had received 414 and 169 lb/acre of DDT from 1946 to 1967, showed that the DDT residues attained a threshold level within a few years after its regular use began. The decline in total residues proceeded at the rate of about 3.5% per year.

556
Degradation of Synthetic Organic Molecules in the Biosphere Natural, Pesticidal, and Various Other Man-Made Compounds

Kilgore, W.W.; Carlson, A.E.; Dagley, S.; Pimentel, D.; Subcommittee on Chemical Additives, National Research Council, Washington, DC

Report of Subcommittee on Chemical Additives, National Research Council, PB-218 665/8, 359; 1972

DEGRADATION; ORGANIC MATTER; PESTICIDES; BIODEGRADATION

557
The Degradation of Organomercury Fungicides in Soils

Kimura, Y.; Miller, V.L.

J. Agr. Food Chem., 12, 253-7; 1964

DEGRADATION; ORGANOMERCURY FUNGICIDES; FUNGICIDES; SOILS; MERCURY

558
A Chomatographic Model for Predicting Pesticide Migration in Soils

King, P.H.; McCarty, P.L.

Soil Sci., 106(4), 248-261; 1968

MODEL; MIGRATION; SOILS; PESTICIDES

559
Degradation of Several Herbicides in a Soil Previously Treated with MCPA

Kirkland, K; Fryer, J.D.; Agric. Res. Counc., Weed Res. Organ., Yarnton/Oxford, England.

Weed Res.(WEREAT), 12(1), 90-5; 1972

HERBICIDES; DEGRADATION; SOILS; OXIDATION; PHENOXYBUTYRATE; MCPA; MCPB; COTTON; PLANTS; BIOASSAY; DICAMBA; DICHLORPROP; MENOPROP; BIOINDICATORS

Soil which received nine previous field treatments of 3.3 kg Mcpa/ha, at intervals of about 6 months, and which became able to detoxify MCPA more rapidly than untreated control soil, was able to degreade mcpb with equal facility, whereas the disappearance rate of phytotoxic residues of Dichlorprop, Mecoprop, and Dicamba, as determined by a bioassay technique, were unaffected by previous soil treatment with MCPA. Beta-oxidation of MCPB to MCPA did not occur as shown by using cotton as an indicator plant.

560
Microbial Decomposition of Pentachlorophenol

Kirsch, E.J.; Etzel, J.E.; Purdue Univ., School of Civil Engineering, Dept. of Environmental Engineering, W. Lafayette, IN 47907

Water Pollution Control Federation, Journal, 45(2), 359-364; 1973, February

BIODEGRADATION; DECOMPOSITION; PENTACHLOROPHENOL; CARBON DIOXIDE; SODIUM PENTACHLORPHENATE

The biodegradation of sodium pentachlorophenate was observed in both proliferating and nonproliferating mixed bacterial populations that had previously received lengthy acclimation to the biocide. Definite proof of dissimilation was obtained by measuring the release of carbon dioxide-14(14CO2) from radioactive sodium pentachlorophenate. The maximum yield of CO2 in a 24-hour exposure period was 68% in nonproliferating cultures. The rate and extent of decomposition in proliferating cultures was significant but less than found in nonproliferating cultures. Spontaneous, nonbiological decomposition of sodium pentachlorophenate was observed but did not exceed 0.1% in a 48-hour reaction period.

561
Degradation of DDT in Forest Humus by Soil and Litter Micro Arthropods

Klee, G.E.

Ann. Zool. Ecol. Anim., 4, 219-224; 1971

DEGRADATION; DDT; HUMUS; SOILS; FORESTS; ARTHROPOD; IRRADIATION

562
Fate of Carbon-14-Labeled Aldrin in Potatoes and Soil Under Outdoor Conditions. 35.

Klein, W.; Kohli, J.; Weisgerber, I.; Korte, F.; Inst. Oekol. Chem., Ges. Strahlen- und Umweltforsch. M.B.H., Munich, Germany

J. Agr. Food Chem.(JAFCAU), 21(2), 152-6; 1973

ALDRIN; SOILS; POTATOES; RESIDUES; INSECTICIDES; METABOLITES; CARBOXYLIC ACIDSOLIC ACID; DIELDRIN; PHOTODIELDRIN; PHOTOALDRIN; LEACHING; TRANSPORT; FATE; RADIOACTIVITY; WATER; TRACER; PLANTS

When carbon 14-labeled aldrin was applied to Soils in Germany (2.9 kg/ha) and England (3.2 kg/ha) to which potatoes had been sown, less than 60% of the total radioactivity recovered from the soil and plants was due to metabolites, mainly dieldrin and a group of hydrophilic products, of which the main compound was identified as dihydrochlordene-dicarboxylic acid (1,2,3,4,8,8-hexachloro-1,4,4A,6,7,7A-hexahydro-1, 4-endo-methyleneindene-5, 7-dicarboxylic acid). Photodieldrin was also detected in small amounts in the potato haulm from England, as were traces of photoaldrin in both soils. The conversion of aldrin was least in the upper soil layer and greatest in deeper soil layers (10-60 cm from surface) and in the plants. Only very low residues were detected in the deeper soil layers in England, whereas more radioactivity was found in the deeper soil samples in Germany. Leaching water of the experiment in Germany contained only dihydrochlordene dicarboxylic acid (0.02 ppm).

563
Conversion of Pesticides Under Atmospheric Conditions and in Soil

Klein, W.; Korte, F.; Inst. Oekol. Chemie, Schloss Birlinghoven, Ger.GERMANY

Trace Subst. Environ. Health Proc. Univ. Mo. Annu. Conf., (25DLAD), 71-80, 1971; 1972

REVIEW; PESTICIDES; ULTRAVIOLET RADIATION; SOILS; TRANSFORMATION

564
Theoretical Aspects of the Persistnece of Organic Matter in Soils

Kleinhempel, D.

Part of Szegi, J. (Ed.). Proceedings of the Symposium on Soil Microbiology, Vol. 2. Budapest, Hungary. 1970, June 16-20. Akademiai Kiado: Budapest, Hungary (p. 209-213) 454 p.; 1972

LIGNIN; POLYMERS; DEGRADATION; MICROBIOLOGY; THEORY; PERSISTENCE; SOILS

565
Separate Determination of Polychlorpinene and DDT in Water and in Soil

Klisenko, M.A.; Verblyudova, N.I.

Hydrobiol. J. (Engl. Transl. Gidrobiol. Zh.) 7(1), 100-102; 1971

SOILS; FRACTIONATION; POLY CHLORPINENE; DDT; WATER

566
Biological and Nonbiological Modifications of Carbamates

Knaak, J.B.

Bull. W.H.O. 44(1-2-3), 121-131; 1971

ANIMALS; PLANTS; INSECTS; INSECTICIDES; CARBARYL; CARBOFURAN; ALDICARB; METHOMYL; ZECTRAN; SOILS; BUX; MEOBAL; CARBAMATES

567
Sorption of Ionised Pesticides by Soil

Knight, B.A.G.; Coutts, J.; Tomlinson, T.E.; Jealott's Hill Res. Stn, Bracknell, England

Part of Sorption and Transport Processes in Soils, Monogr. Soc. Chem. Ind., 37, (p. 54-62); 1970

SORPTION; PESTICIDES; SOILS; REVIEW; IONISED PESTICIDES

568
Insecticide Usage and Residues in a Newly Developed Great Plains Irrigation District

Knutson, H.; Kadoum, A.M.; Hopkins, T.L.; Swoyer, G.F.; Harvey, T.L.

Pestic. Mont. J., 5(1), 17-27; 1971

DIAZINON; PARATHION; ALDRIN; DIELDRIN; SOILS; FOLIAR APPLICATIONS; INSECTICIDES; USAGE; RESIDUES; PLAINS; IRRIGATION

569
Transfer of Phosphorus-32 And Dieldrin among Selected Microorganisms in Soil

Ko, W.H.; Lockwood, J.L.; Mich. St. Univ., East Lansing, MI

Rev. Ecol. Biol. Sol., 7(4), 465-470; 1970

FUNGI; ACTINOMYCETES; NEMATOCIDES; SOILS; INVERTEBRATES; PLANTS; TISSUE; FUNGUS; DIELDRIN; PHOSPHOROUS 32; MYCELIA; COLLEMBOLA; ENCHYTRAEIDS

Phosphorous-32 from lysing fungal mycelia was transferred to an actinomycete, another fungus, nematodes, enchytraeids, and collembola in soil. Dieldrin was also transferred from lysing fungal mycelia to an actinomycete, and from plant tissues to a fungus growing on the tissues. The total amount of phosphorus32 and dieldrin transferred from the donor fungus to other micro-organisms was low, but the soil invertebrates were able to concentrate phosphorus32 presumably through predation.

570
Conversion of DDT to DDD in Soil and the Effect of These Compounds on Soil Microorganisms

Ko, W.H.; Lockwood, J.L.

Can. J. Microbiol., 14(10), 1069-1073; 1968

DDT; DDD; SOILS; MICROORGANISMS

571
Herbicides in the Biosphere

Koch, W.

Meded. Fac. Landbouwwet. Rijksuniv. Gent., 36 (3), 1971, 814-830.

HUMANS; FISH; PFPS; MAMMALS; WATER; SOILS; HERBICIDES; BIOSPHERE

572
Degradation of 2-chloro-3-(4-chlorophenyl) Methylpropionate (Methachlorphenprop) in Soil.

Kocher, H.; Lingens, F.; Koch, W.; Abteilung fur Mikrobiologie and Molekularbiologie, Universitat Hohenheim, Stuttgart, German Federal Republic

Part of Proceedings of 11th British Weed Control Conference, 2, (p. 811-817); 1972

METHACHLORPHENPROP; SOILS; HYDROLYSIS; DEGRADATION; AUTOCLAVING; ADDITIVES; PROPIONIC ACID

In laboratory experiments the hydrolysis of methachlorphenprop in non-sterile soil was complete within a few hours, but did not occur in autoclaved soil, and the propionic acid hydrolysis product was 90% degraded within 20 days. The degradation was inhibited by autoclaving and the addition of sodium azide.

573
Chemical Ecology. 58. Transport of Carbon-14-Labeled Aldrin and Transformation Products in the Soil

Kohli, J.; Weisgerber, I.; Klein, W.; Inst. Oekol. Chem., Ges. Strahlen- und Umweltforsch. M.B.H., Munich, Germany

Chemosphere(CMSHAF), 2(3), 125-30; 1973

ALDRIN; TRANSFORMATION; SOILS; DIELDRIN; PHOTODIELDRIN; TRACER; CARROTS; POTATOES; RADIOACTIVITY; TRANSPORT; AIR; CARBON 14

At 3.5 years after the treatment of soil with a commonly used concentration (2.4kg/ha) of carbon 14-labeled aldrin in aqueous solution, aldrin and its transformation products, dieldrin, and photodieldrin were detectable in the adjacent non-treated soils only in negligible amounts. Carrots and potatoes grown in the non-treated adjacent earth contained radioactivity only in amounts to small to be seperated. Aldrin and its transformation products were not transported through the soil or the air.

574
Ecological Chemistry. 59 Residue Retention and Transformation of Carbon-14-Labeled Dieldrin in Cultivated Plants, Soils, and Ground Water After Soil Application

Kohli, J.; Weisgerber, I.; Klein, W.; Korte, F.; Inst. Oekol. Chem., Ges. Strahler- und Umweltforsch. M.B.H., Munich, Germany

Chemosphere(CMSHAF), 2(4), 153-6; 1973

DIELDRIN; METABOLISM; RESIDUES; INSECTICIDES; TRANSFORMATION; PLANTS; METABOLITES; SOILS; RADIOACTIVITY; TRACER; GROUNDWATER; WATER; OXIDATION; CARBOXYLIC ACID; GROUNDWATER PHOTODIELDRIN; CARBON 14; DIHYDROCHLORDENEDICARBOXYLIC ACID

Radioactivity from carbon 14-labeled dieldrin (0.83 kg/ha), which was added to a chemically defined soil sample containing plants, was found in the ground water in the form of a dieldrin oxidation product, that is, dihydrochlordenedicarboxylic acid and in the plants and soil in the form of unchanged dieldrin, photodieldrin plus hydrophilic metabolites. Approximately 0.16% of the applied dieldrin radioactivity was found in the ground water; the plants and soil contained mostly unchanged dieldrin.

575
Fate of Aldrin-14C in Sugar Beets and Soil Under Outdoor Conditions.

Kohli, J.; Zarif, S.; Weisgerber, I.; Klein, W.; Korte, F.; Inst. Oekol. Chem., Schloss Birlinghoven, Ges. Strahlen- und Umweltforschung MBH, Munich, Germany

J. Agr. Food Chem., 21(5), 855-857; 1973

ALDRIN; SOILS; FATE; BEETS; METABOLITES; DIELDRIN; RESIDUES; PHOTODIELDRIN; PERSISTENCE; DEGRADATION; DIHYDROCHLORDENEDICARBOXYLIC ACID; REACTION PRODUCTS; SUGAR BEETS; PLANTS

Aldrin-14C has been applied to soils under outdoor conditions in Germany (2.9 kg/ha) and England (3.2 kg/ha), and sugar beets have been grown. Upon harvest, more than 95% of the total radioactivity recovered from the plants and more than 40% of the radioactivity recovered from the soils were due to metabolites, mainly dieldrin and a group of hydrophilic metabolic products. The main hydrophilic compound was identified as dihydrochlordene-14C dicarboxylic acid (1,2,3,4,8,8-hexachloro-1,4,4a,6,7,7a-hexahydro-1,4-endomethylene-indene-5,7-dicarboxylic acid); additionally, photodieldrin and two minor acidic compounds were detected. Between 52% and 58% of the total residue in the surface soils was aldrin, but the percentage of aldrin decreased with increasing depth. Only very low residues were detected in the deeper soil layers in England whereas more radioactivity was found in the soil samples in Germany.

576
Organochlorine Insecticide Residues in Everglades National Park and Loxahatchee National Wildlife Refuge, Florida

Kolipinski, M.C.; Higer, A.L.; Yates, M.L.; Water Resourc. Div., Geol. Surv., Miami, Fla.

Pestic. Monit. J.(PEMJAA) 1971, 5(3) 281-8; 1971

ORGANOCHLORINE INSECTICIDES; RESIDUES; WATER; DDT; CRUSTACEANS; FISH; ALGAL MATS; METABOLITES; ALGAE; INSECTICIDES

Water in Everglades National Park and Loxahatchee National Wildlife Refuge contained less than 0.03 microG/l. DDT and its metabolites. Samples of soils underlying marshes had concentrations as much as 3 orders of magnitude greater than those found in water. Algal mats, omnivorous marsh-dwelling crustaceans, and marsh fishes showed concentrations of DDT compounds up to 3 or 4 orders of magnitude greater than those found in water. DDT and its metabolites were found more frequently than other organochlorine insecticides in the materials examined.

577
Soil Degradation of Malathion, A
Phosphorodithioate Insecticide

Konrad, J.G.; Chesters, G.; Armstrong, D.E.

Soil Sci. Soc. Amer. Proc., 33(2), 259-262; 1969

SOILS; DEGRADATION; MALATHION; INSECTICIDES; PHOSPHORODITHIOATE INSECTICIDE; ADSORPTION; HYDROLYSIS; CARBON 14; TRACER; PE

Rates of malathion degradation in soils were related directly to extent of malathion adsorption, suggesting that degradation occurred by a chemical mechanism which was catalyzed by adsorption. Malathion degradation was rapid (50% to 90% in 24 hours depending on the type of soil) in both sterile and non-sterile soil systems, and no lag phase occurred prior to degradation. In aqueous soil-free systems inoculated with a soil extract, a lag phase (7 days) occurred, followed by rapid malathion loss, likely due to microbail degradation. Thus in soils, complete chemical degradation of malathion occurred prior to microbial adaptation to malathion. To obtain information on the pathway and products of malathion degradation, chemical hydrolysis in soil-free systems was investigated using liquid:liquid partition techniques with Carbon 14-labeled malathion. Hydrolysis did not occur in acid systems (GT pH 2), was slow at pH 9 (LT 50% in 20 days) and rapid at pH 11 (GT 99% in 1 day). At pH 9 the hydrolysis resulted in formation of thiomalic acid and diemthyl thiophosphoric acid as final products with accumulation of diethyl thiomalate as an linkages. In soils both ester linkages are hydrolyzed, although not at the same rate, resulting in the accumulation of diethyl thiomalate in some soils. (8 references)

578
Level of DDT Residues in Soil After Anti-Tick
Treatment of Taiga Foci of Tick-Borne Encephalitis

Konstantinov, O.K.; Gorchakovskaya, N.N.; Inst. Polio Virusn. Entsefalitov, Moscow, USSR

Med. Parazitol. Parazit. Bolez.(MPPBAB) 1973, 42(3) 298-304; 1973

DDT; SOILS; RESIDUES; DDD; METABOLISM; DDE; TICKS; INSECTS; TAIGA FOCI; ENCEPHALITIS

579
Phytotoxicity and Persistence of Four
Thiocarbamates in Five Soil Types

Koren, B.; Foy, C.L.; Ashton, F.

Weed Sci., 16(2), 172-175; 1968

PHYTOTOXICITY; PERSISTENCE; THIOCARBAMATE; SOILS

580
Leaching of Trifuralin and Oryzalin in Soil with
Three Surfactants

Koren, E.; Div. Weed Res., Volcani Inst. Agric. Res., Bet Dagan, Israel

Weed Sci.(WEESA6) 1972, 20(3), 230-2; 1972

HERBICIDES; LEACHING; SOILS; SURFACTANTS; TRIFLURALIN; ORYZALIN; WATER; SORPTION; FOXTAIL MILLET; SORGHUM; REDROOT PIGWEED

Surfactants imporved the penetration of Trifluralin into the soil, and thus enhanced its activity. The leaching of trifluralin and Oryzalin with or without the surfactants Tronic, wetting agent Ciba, or Triton X-100, was studied in soil columns. In dry soil without surfactants, leaching of Trifluralin was less than that of oryzalin. In wet soil, Trifluralin leached more than twice as deep as in dry soil. The addition of 2% surfactants increased both depths of water penetration, and herbicide movement, especially in dry soil. There was no direct relation between the ability of the surfactants to improve water penetration and their effects on leaching of the 2 herbicides, suggesting that increased leaching was due to an effect of the surfactant on the sorption-desorption balance, rather than on improved water penetration. The improved movement of Trifluralin into the soil as a result of surfactant action was also supported by a small-plot experiment in which surfactants increased the herbicidal activity of Trifluralin, sprayed pre-emergence, against foxtail millet (SETARIA ITALICA), sorghum, and redroot pigweed (AMARANTHUS RETROFLEXUS).

581
Adsorption, Volatitlity and Migration of
Thiocarbamate Herbicides in Soil

Koren, E.; Foy, C.L.; Ashton, F.

Weed Sci., 17(2), 148-53; 1969

ADSORPTION; MIGRATION; THIOCARBAMATE; HERBICIDES; VOLATILIZATION; SOILS

582
Effect of the Hardness of Water and the
Properties of the Soil on the Herbicidal Activity
of 2,4-D Sodium Salt

Korogchenko, Y.T.

Agrokhimiya (5), 1970, 109-112.

WEEDS; WATER; SOILS; HERBICIDES; 2,4-D; SODIUM; SALT; WATER HARDNESS; SODIUM SALT

583
Fate of Pesticides in the Environment and Problem
of Residues

Korotkova, O.A.; Volkov, A.I.; USSR

Zh. Vses. Khim. Obshchest.(ZVKOA6), 18(5), 552-62; 1973

REVIEW; ORGANOPHOSPHATES; CARBAMATE; PESTICIDES; METABOLISM; FATE; RESIDUES; ANIMALS; PLANTS; MICROORGANISMS

584
Disappearance and Persistence of Aldrin After 5
Annual Applications

Korschgen, L.J.

J. Wildl. Manag., 35(3), 494-500; 1971

PESTICIDES; LOAM; SOILS; DISAPPEARANCE; PERSISTENCE; ALDRIN

585
Recommendations of Workshop on Chemistry and Metabolism of Terminal Residues of Organochlorine Compounds

Korte, F.; Inst. Oekol. Chem., Schloss Birlinghoven, Germany

Fate of Pesticides in Environment, Godron and Breach, London, 293-294; 1972

REVIEW; PERSISTENCE; CHLORINATED HYDROCARBONS; ORGANOCHLORINES; PESTICIDES; RESIDUES; DDT; BENEFIT-RISK; EQUATIONS; DEGRADATION; CONTROL; ENZYME INDUCTION

The following recommendations were proposed. The terms chlorinated hydrocarbons or organochlorine pesticides should be replaced with the chemical name for each compound. The ambiguous term of persistence should be replaced with the concept of function time rhythm. A break-down product present in minute quantities should not be placed under regulatory procedures unless specific strong reasons exist for so doing. While much is known about some of these pesticides, very little is known about others; this must be considered when setting tolerance levels. Critical reviews are needed on specific compounds. Further research is needed in the areas of: organochlorine pesticide breakdown in plants, the troposphere, and the stratosphere; organochlorine compound residues in animal fat, milk, butter, and cheese; the relation of DDT to the environment with an eye toward establishing an acceptable benefit-risk equation for man and the environment; control of global chemical dispersions; the mode of pesticide actions, including synergistic and antagonistic effects; the enzyme induction by chlorinated pesticides.

586
Recent Results of Investigations in Environmental Chemistry

Korte, F.; Inst. Oekol. Chem., Schloss Birlinghoven, Germany

Radiotracer Stud. Chem. Residues Food Agr., Proc. Comb. Panel Res. Coord. Meet.(D8HMIC), 3-14; 1972

CHLORINATED PESTICIDE; FATE; CHEMICALS; INDUSTRIAL CHEMICALS; ORGANOCHLORINES; IRRADIATION; ULTRAVIOLET RADIATION; METABOLISM; MAMMALS; MICROORGANISMS; PLANTS; INSECTS; AIR; INDUSTRY; RISKS; INDUSTRY

The eventual fate in the environment of some radiolabeled chlorinated pesticides was studied including their metabolism in mammals, microorganisms, plants, and insects and their conversion by ultra violet irradiation under atmospheric conditions. A definition of environmental chemicals (bioactive substances) was suggested and the studies necessary to evaluate the risks involved in the use of industrial chemicals were outlined.

587
Chemistry and Metabolism of Terminal Residues of Organochlorine Compounds; State of the Art

Korte, F.; Org.-Chem. Inst., Univ. Bonn, Bonn, Germany

Pestic. Chem., (24WAAY), 2(6), 205-22; 1972

REVIEW; ORGANOCHLORINES; PESTICIDES; METABOLISM; RESIDUES; INSECTICIDES; HERBICIDES; PHOTOISOMERIZATION; PHOTODECHLORINATION; DEGRADATION; DDT; ALDRIN; DIELDRIN; LINDANE; DDA; ANIMALS; PLANTS; ENZYME; METABOLITES; PHENOL; FATE; FATE

Pesticides undergo chemical change due to chemical, photochemical, and enzymatic reactions. A substance is considered unduly persistent whenever a measurable quantity of it continues to exist in some discernible chemical form. Photoisomerization or photdechlorination are the only known abiotic reactions of organochlorine compounds in the environment. Concerning pesticide metabolism, very little is known of the metabolites; many are observed but not identified. Not much is known about the degradation of metabolites to the persistent end products, either under atmospheric conditions or in higher plants. On the contrary, much is known about the metabolism of some pesticides like DDT in a number of organisms. Water soluble metabolites of aldrin and dieldrin, thought frequently mentioned in the literature, are largely unidentified, apart from the phenolic metabolites of lindane and DDA. It is noted that pesticides have different metabolic behaviors in animals and plants. This difference appears in the metabolic end products formed in the different species and in the metabolic rate. Therefore, the chemical structure of a compound is not the deciding factor in determining the fate of the compound is not the deciding factor in determining the fate of the compound under environmental conditions.

588
Technical Environmental Chemicals Occurrence Degradation and Consequences

Korte, F.; Klein, W.; Drefahl, B.

Naturwiss Rundsch., 23(11), 445-457; 1970

PERSISTENCE; PESTICIDES; INSECTICIDES; RECYCLING· ANIMALS; PLANTS; HUMANS; OCCURRENCE; DEGRADATION

589
Investigations on the Fate of Certain Pesticides Under Biotic and Abiotic Conditions Using Tracer Techniques

Korte, F.; Klein, W.; Suss, A.; Siegmund, M.; Switz.

Report (D8RPT7) 1971, No. CONF-710901-144, 22; 1971

HERBICIDES; DEGRADATION; SOILS; MONOLINURON; PYRAZON; SIMAZINE; TRACER; CARBON 14;

14C-labeled Monolinuron, Pyrazon, and Simazine were used to study the degradation of herbicides in different soils. By measuring the formed 14CO2, the characteristics of breakdown were established.

590
Recent Results in Studies on the Fate of Chlorinated Insecticides

Korte, F.; Klein, W.; Weisgerber, I.; Kaul, R.; Mueller, W.; Djirsarai, A.; Inst. Org. Chem., Bonn Univ., Bonn, Ger.

Pesticide Symposium, Collection of Papers Inter-American Conf. Toxicol. Occup. Med., 6th, 7th (26UZAB) 1970, 51-6; 1968

ENDRIN; METABOLISM; PLANTS; ANIMALS; ORGANOCHLORINE INSECTICIDES; FATE; INSECTICIDES

591
Recent Results in Studies on the Fate of Chlorinated Insecticides

Korte, F.; Klein, W.; Weisgerber, I.; Kaul, R.; Mueller, W.; Djirsarai, A.; Inst. Org. Chem., Bonn Univ., Bonn, Ger.

Pesticide Symposium, Collection of Papers Inter-American Conf. Toxicol. Occup. Med., 6th,, 7th(26UZAB), 51-56; 1970

ENDRIN; METABOLISM; PLANTS; ANIMALS; ORGANOCHLORINE INSECTICIDES; FATE; INSECTICIDES

592
Rate of Decomposition and Distribution of Phenmedipham in Soil

Kossmann, K.; Schering A G Lab., Berlin University, Bergkamen, German Federal Republic

Weed Res., 10(4), 349-359; 1970

SUGAR BEETS; BETANAL; HERBICIDES; BEETS, SOILS; DECOMPOSITION; HUMUS; PERSISTENCE

In field and glasshouse experiments, on slightly acid soils of low humus content (used for beet production), the herbicide was continuously decomposed, its persistence being 28 to 55 days, and its penetration only very little beyond 5-cm depth.

593
Absorption of DDT from the Soil, and its Translocation in Plant Stems and Leaves.

Kovaleva, Y.S.; Talanov, G.A.; All-Union Sci. Res. Inst. Vet. Sanit., USSR

Khim. Sel. Khoz., 10(8), 586-589; 1972

DDT; TRANSLOCATION; METABOLISM; STEMS; LEAVES; FRUITS; POTATOES; CORN; SUGAR BEETS; TURNIPS; VETCH; OATS; PLANTS; ADSORPTION; SOILS; RESIDUES; TDE; DDD

The translocation and metabolism of DDT were studied in stems, leaves, and fruits of potato, corn, sugar bett, cattle turnip, vetch, and oat plants. The above plants absorbed DDT from sandy soils, especially during the July and August period of intense growth. Following the application of 3 kg of DDT per ha in early June, the DDT residue levels in cornhusks, potato skin, turnip and sugar beet roots, as well as in stems of vetch and oats at harvesting in September were 0.046, 0.026, 0.206, 0.574, 0.148, and 0.135 mg/kg, respectively. No metabolism of DDT to DDE was observed in corn, beet, turnip, oats, potato, and vetch. The elevated DDD (TDE) levels found in corn and potato plants, as compared to the original pesticide preparation, are most likely due to the conversion of p,p(prime)-DDT into p,p(prime)-DDD in the soil or in the plant.

594
Distribution of Chlororganic Pesticides Along a Soil Profile

Kozhinova, L.A.; Girgor'Eva, T.I.; Yurasova, O.I.; Nikonova, A.G.; Inst. Obshch. Kommunal'N. Gig. Im. Sysina, Moscow, USSR

Khim. Sel. Khoz.(KSKZAN) 1972, 10(3) 198--201; 1972

PESTICIDES; SOILS; DISTRIBUTION; DDT; HEXACHLOROCYCLOHEXANE; PCP; POLYCHLOROPINENE; CHLOROORGANIC PESTICIDES; ORGANOCHLORINE; SOIL PROFILE

DDT, hexachlorocyclohexane, or PCP (polychloropinene) applied to the soil in recommended doses did not penetrate into the deep layer of the chernozem or into the ground water in polluting amounts. The chlororganic pesticides penetrated deeply only into podzolic-soddy soil of light mech. composition.

595
Hygienic Assessment of the Soil and Plants Treated with Poly Chlorpinene

Kozhinova, L.A.; Grigor 'Eva, T.I.; Maslennikova, I.S.

Gig. Sanit. 35(8), 53-56; 1970

BEANS; POTATOES; BEETS; INSECTICIDES; SOILS; PLANTS; POLYCHLOROPINENE; PCP

596
Experimental Data on the Penetration of Hexachloran into Soil

Kozhinova, L.A.; Grigor'Eva, T.I.; Yurasova, C.I.; Inst. Obshch. Kommunal'N. Gig. Im. Sysina, Moscow, USSR

Gig. Sanit.(GISAAA), 36(11), 47-9; 1971

HEXACHLORAN; SOILS; PENETRATION; GROUND WATER; PESTICIDES

Hexachloran dust applied to fertile chernozem soil at 5 kg/ha penetrated to a depth of 1 m in a single season, but 93% of the agrochem. remained in the surface soil layer (0-10 cm). Only 3.5-4.5% of the pesticide reached a depth of 25 cm. These results confirmed laboratory tests and at the concentration used hexachloran did not contaminate ground water.

597
Distribution of Chlor Organic Pesticides According to Sections of Soil

Kozhinova, L.A.; Grigor'Eva, T.I.; Yurasova, C.I.; Nikonova, A.G.

Khim. Sel'sk. Khoz. 10(3), 38-41; 1972

DDT; BHC; SOILS; PESTICIDES

598

Herbicide Accumulation in the Soil and its Effects on Plant Production in Case of Sprinkler Irrigation with Herbicide-Contaminated Waters

Kramer, D.; Schmaland, G.; Inst. Wasserwirtsch. Berlin, Berlin, East Germany

Arch. Pflanzenschutz(AVPZAR), 8(4) 323-37; 1972

WATER; HERBICIDES; PLANTS; SOILS; IRRIGATION; SAND; LOAM; CLAY; MODEL; RESIDUES

The increasing use of herbicides produces a great number of residual problems. In view of the herbicides entering watercourses, special detection methods are required for the control of the waters. Combination of chemical and biological methods seems to be suitable. It is doubtful whether the data on the phytotoxicity of waters obtained by the germination tests which, for the time being, are to be performed according to the standard TGL 22766 may be transferred at all. The injuries that may result from sprinkling herbicide contaminated waters were tested in two field experiments on three soil classes (sand, loam, clay) and with two herbicide concentrations. Sprinkler irrigation was applied to both field corps and grassland. The yields and ingredients that were obtained in the first test year (1969) are presented. The d(t) obtained in the germination and young plant test is not reliably reproduced under field conditions. If the sprinkling water contains herbicides in the concentrations established in these tests, a certain yield decline will have to be expected for susceptible plants, light soils and, highly absorbant soils and a low yield potential. Sprinkling the water of watercourses subsequently moved been treated with chemicals for weed control does not cause any yield decline, if the present kind of soil and plants is taken into account. A comparison of the concentrations revelas that differences of effectivity are to be expected only in a ratio of 1: greater than 2.7. The preliminary relationships that were found between herbicide, soil and plant are discussed by means of a model. However, final statments can only be made on the basis of results that will be obtained if these experiments are continued over several years.

599

Water-Soil-Plant Interactions with Terbacil

Kratky, B.A.; Warren, G.F.; Dep. Hortic., Purdue Univ., Lafayette, Indiana

Weed Sci.(WEESA6), 21(5), 451-4; 1973

TERBACIL; PHYTOTOXICITY; SOILS; HERBICIDES; SOIL MOISTURE; BUTHLCHLOROMETHYLURACIL; SOIL-WATER INTERACTIONS

600

DDT Residues in Soils of the Koscierzyna District

Krechniak, J.; Dubrawski, R.; Czarnowski, W.; Akad. Med., Gdansk, Poland

Gdansk. Tow. Nauk., Rozpr. Wydz. 3(GTRWAC) 1971, No. 8, 65-71; 1971

DDT; SOILS; RESIDUES; INSECTICIDES; PODZOL; HALF-LIFE; ORGANOCHLORINE

Residual amounts of 0.04-0.12 ppm were found in the podzols of the Koscierzyna District, Polant. The average half-life for DDT was 9.1 years.

601

Effects of meturin on Biological Activity of Soil

Kruglov, Y.V.; Gersh, N.B.; Bey-Biyenko, N.V.; All-Union Sci. Res. inst. Agricult. Microbiol., USSR

Khim. Sol. Khoz., 11(4), 294-296; 1973

METURIN; SOILS; PH; BACTERIA; FUNGI; ACETOBACTER; MICROORGANISMS; LOAM; SAND

The effects of 4 kg/ha doses of meturin were assessed on the biological activity of sandy soils with pH 5, and a total nitrogen content of 0.21-0.23%; and on that of loamy soils with pH 6.3 and a total nitrogen content of 0.24%. The numbers of fungi, heterotrophic bacteria, and acetobacter in both types of soil and of denitrifying and aerobic celluloytic bacteria in loamy soils were reduced. The nitrifying bacteria count and the nitrifying capability of the soil did not change significantly. Invertase and protease activity was reduced and urease activity intensified; catalase activity did not change significantly. The results indicate that meturin is not toxic to soil microorganisms.

602

Detoxication of Simazine by Microscopic Algae

Kruglov, Y.V.; Paromenskaya, L.N.

Microbiology (Engl. Transl. Mikrobiologiya) 39(1), 139-142; 1970

SOILS; ALGAE; DETOXIFICATION; SIMAZINE

603

Aldrin and Lindane Residues in Soil after Application in Mixtures with Superphosphate.

Krzywanska, J.; Mackiewicz, S.

Biul. Inst. Ochr. Roslin, No. 45, 109-114; 1969

ALDRIN; LINDANE; RESIDUES; SOILS; HEXACHLOROBENZENE; PESTICIDES

Two years after broadcasting onto the soil surface, 17% of the lindane applied occurred in the top 10 cm of soil and 17% in the 10-20 cm layer. The corresponding figures for aldrin were 30% and 30%.

604

Formation and Importance of Carbamate Insecticide Metabolites as Terminal Residues

Kuhr, R.J.; Dep. Entomol., New York State Agric. Exp. Stn., Geneva, N. Y.

Part of Pesticides Terminal Residues, International Symposium, 1971 (p. 199-220); 1971

REVIEW; CARBAMATES; INSECTICIDES; METABOLISM; METABOLITES; HUMANS; MAMMALS; INSECTS; PLANTS; TERMINAL

A review and discussion of the metabolism of carbamates in man, mammals, insects, and plants; degradation of carbamates by soil and light, and the toxicity of carbamate metabolites in human and mammalian systems. (113 references)

605

DDT Residues in Soil, Water, and Fauna from New York Apple Orchards

Kuhr, R.J.; Davis, A.C.; Bourk, J.B.

Pesticides Monitoring Journal, 7(3/4), 200-204; 1974, March

APPLE ORCHARDS; DDT; RESIDUES; METABOLITES; DDE; DDD; DICOFOL; TREES; ORCHARDS; STREAMS; STREAM-BOTTOM MUD; ANIMALS; WATER; WORMS; SLUGS; SNAILS; TADPOLES; FINGERLINGS FISH; FROGS

Five commercial apple orchards which had not been sprayed extensively with DDT since approximately 1960 were surveyed in 1972 for residues of DDT and its metabolites. In addition to the parent compound DDE and DDD were almost always recovered, but no dicofol was detected in any soil sample. Total residues in the top 6-in. soil layer under neath the trees ranged from 21.8 to 259 lb/acre. Between the rows of trees the levels were considerably lower; they ranged from 7.3 to 78.5 lb/6-in. acre. In one heavily contaminated orchard, researchers also analyzed stream water, stream-bottom mud, and animals. Very low amounts of DDT (0.32 ppt) and DDD (0.042 ppb) were found in the water, and residues in stream-bottom mud totaled less than 1 ppm. Worms slugs, snails, tadpoles, fingerlings fish, and frogs all contained DDT, DDE, and DDD.

606

DDT Residues in a Vineyard Soil After 24 Years of Exposure

Kuhr, R.J.; Davis, A.C.; Taschenberg, E.F.; Dep. Entomol., New York State Agric. Exp. Stn., Geneva, N. Y.

Bull. Environ. Contam. Toxicol.(BECTA6), 8(6), 329-33; 1972

DDT; VINEYARDS; SOILS; GRAPES; DDD; DEGRADATION; RESIDUES

Analytical data indicated that most of the DDT residues were confined to the top 3-inch layer, that about half the DDT applied over a 6-year period was not recovered from the soil, that two-thirds of the DDT applied over a 12-year period was not recovered form the soil, and that the only degradation product present was DDE.

607

Pesticides in the Soil

Kunatsuka, S.; Nagoya Univ., Nagoya, Japan

Kagaku Kogyo(KAKOAY), 23(11), 1489-96; 1972

REVIEW; AGROCHEMISTRY; SOILS; PESTICIDES; MOVEMENT; ADSORPTION; DEGRADATION; ORGANOPHOSPHATES; HALF-LIFE; PARATHION; DIMETHOATE; DIAZINON; HERBICIDES; PH; LINDANE; WATER; DDT; ALFALFA; CREATION; PCP; RICE; PADDIES; CARBON; RESIDUES

General chemical pollution, movement, adsorption in the soil, and residue and degradation processes are reviewed. In Japan the duration of chemical residue in the soil is relatively short because of high humidity and warm temperature; organophosphate residues decompose rapidly and usually disappear within several months. The half life of parathion is six days, or a 67% decreases in 17 days; the half life of dimethoate is two and a half days; that of diazinon is 20-80 dyas or in some cases less than 17 days. The degradation period for most herbicides is one to two months and depends on soil conditions, water content, temperature, and ph, gamma-bhc (lindane) decomposes 30% in six weeks with a water content of 60-80%; in 100% water almost no residue is found in six weeks. Seventy-five percent of DDT remains for more than six months under an aerobic conditions. The addition of 1% alfalfa or creation of an anaerobic condition reduces DDT to 1% in 12 weeks. The half-life of PCP in a wet rice paddy is 12 days to several months; in soil with extremely limited carbon content almost no portion is degraded in 50 days. If soil is disinfected completely, residues will not be degraded. Bacteria and soil and the chemical process of residue degradation are briefly reviewed.

608
Reactions of Picloram and 2,4-D with Montmorillonite Clays and Soils

Kuo, E.C.; Oregon State Univ., Corvallis, Oreg.

Thesis, Oregon Stake University, Corvallis, Oregon Univ. Microfilm, Ann Arbor, Mich., Order No. 73-21,315; 1973

PICLORAM; CHLOROPHENOXYACETATE; SOILS; REACTIONS; MONTMORILLONITE; MOBILITY; ADSORPTION; 2,4-D; CLAY; PH; THIN-LAYER CHROMATOGRAPHY; BATCH EQUILIBRIUM; ORGANIC MATTER; SOLUBILITY; CARBONYL OXYGEN; CARBOXYL GROUP; NITROGEN; HYDROGEN; ALUMINUM

Mobility and adsorption of picloram and 2,4-D on 43 western soils, measured with soil thin-layer chromatography and batch equilibration techniques, were correlated with soil pH, organic matter content, and aluminum extracted with ammonium acetate at pH 4.8. predicted adsorption based on these values deviated by 6.1% for picloram and 7.3% for 2,4-D from measured adsorption values. Predictability was better for soils with pH less than 7. picloram solubility was increased in salt solutions less than 0.5 N and decreased in salt solutions of 0.5 N or higher. Picloram mobility was reduced by addition of charcoal to soils. Adsorption of picloram by h-montmorillonite increased as suspension pH decreased. With an increase in acidity, the picloram was hydrogen bonded to the clay colloid surface. Spectral studies indicated that the picloram molecule could not accept an extra proton due to its dipolar nature, low basicity, and the presence of strong electron withdrawing chloro and carboxylate functional groups. The annular nitrogen of picloram, rather than the carbonyl oxygen, interacted with hydrogen or aluminum atoms of montmorillonite.

609
The Possibility of Contaminating Underground Waters with Mono nitrotoluene

Kupyrov, V.N.

Gig. Naselennykh Mest. Resp. Mezhved. Sb., (9), 84-87; 1970

HERBICIDES; SANDY CLAY; SOILS; FILTRATION; MINERALIZATION; SOILS; CLAY; WATER; MONONITROTOLUENE

610
Degradation of Several Herbicides in Soils under Different Conditions

Kuwatsuka, S.

Part of Matsumura, Fumio, G. Mallory Boush and Tomamasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. OISO, Japan, October, 1971. Academic Press: New York, N.Y.; London, England. 1972 (p. 385-400) 637 p.; 1972

MICROBES; DEGRADATION; HERBICIDES; SOILS

611
Persistence and Disappearance of Herbicides in Soil

Kuwatsuka, S.; Nagoya Univ., Nagoya, Japan

Shokubutsu Boeki (SHBOAO), 27(10), 407-13

REVIEW; HERBICIDES; RESIDUES; SOILS; PERSISTENCE; DISAPPEARANCE

612
Preservation Time of Herbicides in Air-Dried Soil Perserved Under Laboratory Conditions

Kuz'min, I.A.; Karel. Fil., Inst. Lesa, USSR

Khim. Sel. Khoz.(KSKZAN) 1973, 11(7), 543-5; 1973

HERBICIDES; DECOMPOSITION; SOILS; DALAPON; SODIUMTRICHLOROACETATE; TCA; DECOMPOSITION; STORAGE

Neither dalapon nor Na trichloroacetate decomposed in air-dried soil upon prolonged storage under laboratory conditions.

613
Microbiological Decomposition of Atrazine in Soils of Different Types (Carbon 14 Experiments)

Kuryakina, T.I.; Rachinskii, V.V.; Nepomiluev, V.F.

Izv. Timiryazev. Sel'.-khoz, Akad., 6, 119-124; 1970

ATRAZINE; SOILS; PODZOL; PEAT-BOG; SOILS; CHERNOZEM; DECOMPOSITION; MICROBES; TRACER; PESTICIDES

In derno-podzolic and peat-bog soils and in leached chernozem, 14C-atrazine was decomposed microbiologically to 14CO2. Atrazine was not decomposed in thermally or chemically sterilized soil. Decomposition was most intense and rapid in the peat-bog soil. Atrazine was decomposed when sterile soil was inoculated with PENICILLIUM TARDUM; the rate of decomposition was greatest in the peat-bog soil and leached chernozem.

614
Criteria for Standardizing Pesticide Levels in Soil

I'Cchev, I.V.; Danon, S.; Kuiumdzhieva, T.; Dzezeva, G.

Roczniki Panstwowego Zakladu Hig., 22(1), 33-37; 1971

INSECTICIDES; DIPTEREX; TRICHLORFON; DIFFUSION; PESTICIDES; SOILS

The influence of two types of soil, clay and sandy soil, on two insecticides, DDT and dipterex (Trichlorfon), was tested. The following parameters were investigated: the stability of the pesticide in the soil, the rate and depths of diffusion, the influence on soil microorganisms and on soil chemical composition. A proposal is put forth to use the established indices for the standardization of pesticide residue levels in soil. (19 references)

615

Microbial Metabolism of Dinitramine

Laanio, T.L.; Kearney, P.C.; Kaufman, D.D.

Pest. Biochem. Physiol. 3(3), 271-277; 1973

DINITRODIAMINE; DINITROANILINES; HERBICIDES; SOILS; MICROORGANISMS; METABOLISM

616

Further Studies of the Fate of Aldicarb in Soil

LaBull, D.L.; Stokes, R.A.; Coppedge, J.R.; Ridgeway, R.L.

J. Econ. Entomol., 63(4), 1223-1285; 1970

ALDICARB; SAND; LOAM; CLAY; SOILS; FATE; HALF-LIFE; OXIDATION; SULFOXIDE; SULFONE; VOLATILIZATION; EVAPORATION; WATER; COTTON FIELD

Laboratory studies were made to determine the fate of 14-C-labeled aldicarb in sand, loam, clay and mullch soils maintained at different moisture levels of 0, 50 and 100% of field capacity and at pH values of 6, 7 and 8. For the most part, no important differences could be attributed to pH within the range used. Aldicarb was relatively stable in all dry soils, in sand at all moisture levels and in loam with 50% moisutre; the half-life of all toxic compounds exceeded 56 days. A moisture level of 50% was optimum for the oxidation of aldicarb to its toxic sulfoxide and sulfone derivatives in loam, clay and much and a moisture level of 100% caused a substantially faster rate of decomposition to nontoxic products in the same soils. Other laboratory studies with 35-S-labeled aldicarb demonstrated that the volatilization of aldicarb and it derivatives was influenced greatly by soil moisture; as the rate of the evaporation of water increased, so did volatilization of radioactivity from treated soil. Field studies were conducted with loam and sandy soils that were treated with 35-S-labeled aldicarb, confined in packets made of stainless-steel screen and buried in a cotton field, where they were exposed to wet or dry conditions. Under extremely wet conditions, all radioactivity was lost from the packets in a matter of hours. Under dry conditions, the half-lives of the toxic compounds were 1 day in sand and 4 to 7 days in loam. (9 references)

617

Role of Light in the Phytotoxicity of Soil Herbicides

Ladonin, V.F.; USSR

Tr. Vses. Nauch.-Issled. Inst. Udobr. Agropochvoved.(TVUAAG) 1971, No. 51, 207-19; 1971

HERBICIDES; PEAS; INHIBITION; LIGHT; PROPAZINE; DIURON; PYRAMIN; PHYTOTOXICITY

618

Fluometuron Soil Solvent Interactions

Lafleur, K.S.

Soil Sci, 116(5), 376-381; 1973

HERBICIDES; CHEMICAL STRUCTURE; ABSORPTION; DESORPTION; FLUOMETURON; SOILS

619

Movement of Toxaphene and Fluometuron Through Dunbar Soil to Underlying Ground Water

Lafleur, K.S.; Wojeck, G.A.; McCaskill, W.R.; South Carolina Agric. Exp. Stn., Clemson Univ., Clemson, S. C.

J. Environ. Qual.(JEVQAA) 1973, 2(4) 515-18; 1973

TOXAPHENE; FLUOMETURON; SOILS; PESTICIDES; GROUND WATER; TOPSOIL; PERSISTENCE; MOVEMENT

Toxaphene and fluomethuron were applied at 100 and 40 kg/ha, respectively, to topsoil. Loss from soil and accumulation in the underling ground water were monitored for 1 year. Toxaphene loss from topsoil occurred in 2 stages. The second (major) stage was crudely linear on log residue vs. log time plot. The half residence time was less than 100 days. Fluometuron loss from topsoil occurred in 1 continuous crudely linear episode. The half-residence time was less than 120 days. Both compunds, were found in the underlying ground water within 2 months after application, and persisted in the ground water during the entire year.

620

Determination of Organochlorine Insecticide Residues in Market Vegetables by Thin Layer Chromatography Using a Multiband Plate for Clean Up

Lakshminarayana, V.; Menon, P.K.

J Food Sci Technol, 6(4), 272-274; 1969

ALDRIN; DDT; ENDRIN; LINDANE; CHLORDANE; HEPTACHLOR; INSECTICIDES; RESIDUES; VEGETABLES; THIN LAYER CHROMATOGRAPHY; ORGANOCHLORINE; INSECTICIDES

621

Some Factors Affecting Degradation of Organchlorine Pesticides by Bacteria

Langlois, B.E.; Collins, J.A.; Sides, K.G.

J Dairy Sci, 53(12), 1671-1675; 1970

DDT; DIELDRIN; HEPTACHLOR; DEGRADATION; ORGANOCHLORINE PESTICIDES;; PESTICIDES

622

Effect of Chlorinated Aliphatic-Acids on Gas and Volatile Fatty-Acid Production in Anaerobic Soil

Laskowski, D.A.; Broadbent, F.E.

Soil Sci Soc Amer Proc 34 (1). 1970 72-76.

PESTICIDES; DEGRADATION; GAS CHROMATOGRAPHY; GAS; FATTY ACID; SOILS

623
Chlorinated Insecticide Residues in Wildlife and Soil as a Function of Distance from Application

Laubscher, J.A.; Dutt, G.R.; Roam, C.C.; Coll. Agric., Univ. Arizona, Tucson, Ariz.

Pestic. Monit. J.(PEMJAA) 1971, 5(3) 251-8; 1971

CHLORINATED INSECTICIDES; WILDLIFE; SOILS; DDT; INSECTICIDES

Chlorinated insecticide residue levels in the soil and wildlife downwind from an application area decrease as the distance from the area of application increases. The residue levels of DDT and its metabolites were 3.6-6700 ppb in the soil, 6-929 ppb in the whitefooted mouse (PEROMYSCUS SPECIES), and 2.9-2770 ppb in other animals. DDT residue levels in biological specimens declined as the soil insecticide concentrations declined.

624
Diffusion of 3 Chloro S-Triazines in Soil

Lavy, T.L.

Weed Sci, 18(1), 1970 53-56

HERBICIDES; DIFFUSION; CHLORO S-; SOILS; TRIAZINES

625
Degradation of 2,4-D and Atrazine at Three Soil Depths in the Field

Lavy, T.L.; Roeth, F.W.; Fenster, C.R.

J. Environ. Qual. (JEVOAA), 2(1), 132-7; 1973

CHLOROPHENOXYACETATE; ATRAZINE; SOILS; HERBICIDES; DEGRADATION; 2,4-D

Under ordinary field conditions, 2,4-D dissipated within a growing season, even if it leached to a depth of 90 cm, whereas atrazine degraded below the plow layer at a slower rate than it did hearer to the soil surface. Degradation of 2,4-D stored in field pits at 15-, 40-, and 90-CM depths was rapid under aerobic soil conditions. Rates of atrazine degradation decreased with increasing soil depths. In a silty clay loam, phytotoxic amounts of atrazine dissipated during the first 5 months at the 15-cm depth, and during the first 17 months at the 40-cm dpeth. Atrazine treated samples buried at 90 cm in the same profile contained phytotoxic amounts. Of atrazine after 41 mohths, as shown by a soybean bioassay and gas chromatography.

626
The Pollution Potential in Pesticide Manufacturing

Lawless, E.W.; Von, R.; Ferguson, T.L.; Midwest Research Inst., Kansas City, MO

Tech. Studies Report; Pesticides Study Series No. 5.; Contract EPA-69-01-0142; Monitoring Agency Rept. No. EPA-OWP-TS-00-72-04: Proj. MRI-3556-C; 276 p.; 1972, June

PESTICIDES; INDUSTRY; AIR; WATER; PLANTS; SYNTHESIS CHEMISTRY; HAZARDOUS MATERIALS; WASTE DISPOSAL; INDUSTRIAL WASTES; INSECTICIDES; HERBICIDES; DUST CONTROL; INDUSTRIAL WASTE TREATMENT; PACKING; DDT; ALDRIN; DIELDRIN; CHLORDAN; MALATHION; LIQUID WASTE DISPOSAL; TOXAPHENE; DISULFOTON; PHORATE; PARATHION; METHYL PARATHION; CARBARYL; TEMIK; 2,4-D; 2,4,5-T TRAZINE; TRIFLURALIN; METHANE; CAPTAN

The study surveys and evaluates the environmental pollution potential associated with the manufacture, formulation, and marketing of pesticides, including such related activities as packaging, transportation and warehousing, i.e., all of the operations up to the point where a pesticide is placed in the hand of the normal consumer. The topics include the following: history; present production volumes and sites; modern manufacturing methods; formulation of pesticides; and marketing.

627
Ways and Means to Influence the Activity and the Persistence of Triazine Herbicides in Soils

Le Baron, H.M.

Part of Gunther, F. A. (Ed.). Residue Reviews, Vol. 32. Triazine Herbicides. Symposium. Springer-Verlag: New York, N.Y.; Heidelberg, West Germany. 1970 (p. 311-353) 413p.; 1970

PERSISTENCE; TRIAZINE; HERBICIDES; SOILS

628
Kinetic and Equilibrium Study of the Adsorption of Carbaryl and Parathion upon Soil Organic Matter Surfaces

Leenheer, J.A.; Ahlrichs, J.L.; Dep. Agron., Purdue Agric. Exp. Stn., Lafayette, Indiana

Soil Sci. Soc. Amer., Proc.(SSSAA8) 1971, 35(5) 700-5; 1971

INSECTICIDES; ADSORPTION; SOILS; PARATHION; CARBARYL

Insight into the mechanisms of carbaryl and parathion adsorption on organic matter derived from silty clay loam, silt loam, and muck soils, was obtained by 2-fold fold kinetic and equilibrium study of adsorption in nonflow aqueous systems. The differences in adsorptive characteristics of the various types of organic matter were small, but changing the saturating cation from Ca2+ to H+ increased the adsorptive capacities. Kinetic adsorption studies conducted at 5, 25 and 40.deg., showed the rate to increase as the temperature increased, with the magnitude of the initial rate constent being 10-4 sec-1. The rate-limiting step was the diffusion of the insecticide solute molecules. To the surface of the adsorbent for the first 10 min. of adsorption. At longer times, intraparticle diffusion of the adsorbate into the interior of the adsorbent particle was rate limiting.

629
Quantitative Description of Pesticide Persistence and Mobility in Soil

Leistra, M.; Lab. Res. Insectic., Wageningen, Neth.

Meded. Fac. Landbouwwetensch., Rijksuniv. Gent (MFLRA3), 38(3), 769-774; 1973

PESTICIDES; SOILS; COMPUTER MODEL; MODEL; HERBICIDES; PERSISTENCE; MOBILITY; FUMIGANTS; LEACHING

The simulation of pesticide behavior in soil by computer models is discussed. Models illustrating herbicide persistence in the top layer, evaporation of a soil fumigant, and the leaching of a mobile compound to deeper soil layers are given.

630
Diffusion and Adsorption of the Nematicide 1,3-Dichloropropene in Soil

Leistra, M.; Laboratory for Research on Insecticides, Wageningen, Netherlands

Agricultural Research Reports, Wageningen, 769, 105 p.; 1972

1,3-DICHLOROPROPENE; ADSORPTION; SOIL MOISTURE; FUMIGATION; DIFFUSION; NEMATOCIDES; ORGANIC MATTER; SOILS

Soil samples were taken at different depths and different times after application of cis and trans 1,3-dichloropropene in field trials. The extent of adsorption was roughly proportional to the soil organic matter content. Differential equations were derived for 1 or 2 dimensional systems to describe diffusion from which dose patterns were computed. Of the weather factors, soil moisture had the greatest influence on the efficiency of fumigation.

631
Diffusion of 1,3-Dichloropropene for a Plane Source in Soil

Leistra, M.; Lab. for Research of Insecticides, Wageningen, Netherlands

Pestic. Sci., 2, 75-79; 1971

1,3-DICHLOROPROPENE; SOILS; NEMATOCIDES; DISTRIBUTION; DIFFUSION; EQUATIONS

Equations are presented for the distribution of cis-and trans-1,3-dichloropropene in soils following plough- and surface blade-injection.

632
Distribution of 1,3-Dichloropropene Over the Phases in Soil

Leistra, M.

J Agr Food Chem 18 (6). 1124-1126.; 1970

GAS CHROMATOGRAPHY; MATHEMATICAL MODEL; FUMIGANTS; GAS; SOILS; 1,3-DICHLOROPROPENE; HUMUS SAND; PEATY SAND; WATER; PEAT

The distribution of cis- and trans- 1, 3-dichloropropene in the phases in soil was determined in order to obtain data for mathematical models describing the movement of these fumigants in soil. Measurements were made on a humus sand, a peaty sand and a peat at 2 degrees, 11 degrees and 20 degrees C. Concentrations in the vapour and water phases were measured by gas chromatography. From these results, the amount absorbed was calculated. The adsorption isotherms appeared to be linear in the important concentration range. The trans-isomer was adsorbed considerably more strongly than the cis- isomer was. The adsorption coefficients were proportional to the organic-matter content of the soil. The amount adsorbed at a particular concentration in the vapour phase at 2 degrees c was about 3 times higher than the amount adsorbed at 20 degrees.

633
Computation Models for the Transport of Pesticides in Soil

Leistra, M.; Lab for Insecticides Research, Netherlands

Residue Reviews, 49, 87-131; 1973

TRANSPORT; SOILS; PESTICIDES; REVIEW; MODEL; MATHEMATICAL MODEL

The possibilities for employing computation models in the quantitative study of pesticide transport in soil are surveyed. Instances of their use in research on pesticides and some other substances are discussed. Differential equations formulated with varying degrees of generalization utilize characteristics applicable to the pesticides-in-soil system. The nature of basic data available for a quantitative approach is briefly discussed, with reference to more detailed reviews in the case of each subject. Emphasis is on chromatographic transport of pesticides with the liquid phase in soil. (52 refs)

634
Micrometeorological Measurement of Pesticide Vapor Flux from Bare Soil and Corn under Field Conditions

Lemon, E.R.; Parmele, L.H.; Taylor, A.W.

Water Air Soil Pollut., 1(4), 433-451; 1972

MOVEMENT; DIELDRIN; HEPTACHLOR; VAPOR; WATERSHEDS; WATER; CORN; PESTICIDES

Micrometeorological estimates of evapotranspiration using hourly data were successfully applied in an evaluation of the movement of dieldrin and heptachlor vapor from a watershed treated with each compound at 5.6 kg/ha (disced in). Diffusivity coefficients were assumed identical for water and pesticide since they depend on the atmosphere into which each is dissipated and not on the chemical character of the compound. The pesticide flux intensity was calculated by measuring pesticide concentration profiles and considering the above assumption. At later stages of crop development the approach was modified since water vapors were released from both crops and soil while pesticide residue vapors originated in the soil. The overall flux rate of dieldrin increased from near 0 in the morning to about 200 ng cm 2S (-1) X 10 (-6) at noon and then decreased toward zero in the evening. The data suggests that no net condensation or evaporation of pesticide occurs from the crop. Pesticide residue in the corn was about 1 to 2% of the total pesticide flux out of the soil between planting and harvest. Similar results were obtained with heptachlor. Corn leaves 30 m downwind from the treated plot accumulated 5 to 10% of the residues found on plants within the treated area.

635
Mercury in the Environment. A Global Review Including Recent Studies in the Delaware Bay Region

Lepple, F.K.; Delaware Univ., Newark. Coll. of Marine Studies

Report No. DEL-SG-8-73; Monitoring Agency Rept. No. NOAA-73040201; Contract NOAA-3-35223; 76 p.; 1973, March

REVIEW; MERCURY POISONING; MERCURY; ANALYSIS; SEDIMENTS; SOILS; COAL; FLUX RATE; SAMPLING; WATER; ANIMALS; AIR; TOLERANCE LIMITS; ATMOSPHERE; BIOSPHERE; LITHOSPHERE; HYDROSPHERE; FLUX

The first section of this two-part report reviews basic properties of mercury and its compounds as related to their effect on various facets of the environment. Among the topics discussed are the chemical forms and hazards of mercury, incidents of mercury contamination, governmental standards and tolerance limits, levels of mercury in the atmosphere, biosphere, lithosphere and hydrosphere, and the flux through each segment. The reality of the 'mercury problem' globally and locally is evaluated. A comprehensive review of the accepted methods of analyses for mercury and its compounds is also presented. The second section reports on recent studies of mercury levels in the Delaware Bay Region and compares the concentrations found in the waters and sediments to values from other areas.

636
Movement of Pesticides in Soil

Letey, J.; Farmer, W.J.

Part of Guengi, W.D. (Ed.), Pesticides in Soil and Water, Madison, WI, American Society of Agronomy, p. 67-98; 1974

MOVEMENT; PESTICIDES; SOILS

637
Mass Transfer

Letey, J.; Oddson, J.K.

Part of Organic Chemicals in the Soil Environment (p. 399-440), New York, Dekker; 1972

MASS TRANSFER; SOILS; ORGANIC CHEMICALS

638
Investigating the Adsorption of EPTC by Soil.

Levchenko, N.P.; Gortlevskii, A.A.

Khimiya v Sel'skom Khozyaistve, 8(5), 364-366; 1970

EPTC; RESIDUES; SOILS; SOIL MOISTURE; ADSORPTION; HERBICIDES; PHYTOTOXICITY

In experiments in which oven-dry and air-dry soil samples were exposed to EPTC vapour for one month, EPTC adsorption was greater in soils with a larger exposed surface area. EPTC residues in soil were determined by wheat bioassay. An increase in soil moisture reduced adsorption and increased the amount of herbicide which became desorbed and phytotoxic.

639
Pesticide Contamination of a Shallow Bored Well in the Southeastern Coastal Plains

Lewallen, M.J.

Ground Water 9 (6). 1971 45-49.

SOILS; PESTICIDES; COASTAL PLAINS; WELL WATER; GROUND WATER

640
Interaction of Atrazine with Fractions of Soil Organic Matter

Li, G.C.; Univ. Rhode Island, Kingston, R. I.

Thesis, University of Rhode Island, Kingston, R.I., 109 p.; 1971

ATRAZINE; SOILS; ORGANIC MATTER; HUMIC ACID; PESTICIDES

A disser.

641

Atrazine Hydrolysis as Catalyzed by Humic Acids

Li, G.C.; Felbeck, G.T.; Univeristy of Rhode Island, Kingston

Soil Science, 114(3), 201-209; 1972

ATRAZINE; HYDROLYSIS; HUMIC ACIDS; HALF-LIFE; PH; ACTIVATION ENERGY; PESTICIDE

The effects of hydrogen ion, buffer-ion (acetate) and humic acid on the hydrolysis of atrazine in aqueous solution were studied. Results indicated that half-life values were least at low pH values and increased with increasing pH. Both humic acid and acetate buffer-ion reduced the energy barrier (Arrhenius' activation energy) for atrazine hydrolysis, probably because of the formation of H-bonding between humic acid and atrazine, and between non-ionized buffer-ion and the atrazine molecule. Based on Arrhenius' frequency factor, it was suggested that (a) the atrazine molecules probably lined up more correctly for reaction on humic acid than with acetate buffer-ion and (b) that the alignment of atrazine molecules on humic acid may play an important part in the humic acid-catalyzed hydrolysis of atrazine.

642

A Study of the Mechanism of Atrazine Adsorption by Humic-Acid from a Muck Soil

Li, G.C.; Felbeck, G.T.; Rhode Island University, Kingston, RI

Soil Sci, 113(2), 140-148; 1972

HYDROGEN BOND; CARBOXYL GROUP; PHENOLIC; HYDROXYL GROUPS; ATRAZINE; ETHANOL; HUMIC ACID; ADSORPTION; METHYLATION; DIMETHYL SULPHATE; DIAZOMETHANE; DIAZOMETHANE; ISOTERIC HEAT

Atrazine solution (15-200 micromol/5 ml ethanol) was equilibrated with 200 mg samples of the ethanol-insoluble fraction of a humic acid at 3 and 25 degrees C. Atrazine adsorption gave a langmuir type isotherm at both temperatures but adsorption was 29.41 micromol/200 g at 25 degrees c and 7.07 micromol/ at 3 degrees C. Adsorption after methylation of the humic acid with dimethyl sulphate, methylation with dimethyl sulphate followed by diazomethane and calcium saturation with CaoAc was 15.88, 7.95 and 4.06 micromol, respectively. The equilibrium constant of atrazine adsorption was 2.3 x 1E-3, 7.6 x 1E-3, 4.96 x 1E-3, 7.7 x 1E-3 and 9.13 x 1E-3 for untreated humic acid at 25 degrees C untreated humic acid at 3 degrees C, dimethyl sulphate methylated, dimethyl sulphate and diazomethane methylated and Ca-saturated humic acid, respectively. The average isoteric heat of atrazine adsorption was 8 kcal/mol.

643

Environmental Factors Affecting Fate of Pesticides

Lichtenstein, E.P.; Dep. Entomol., Univ. Wisconsin, Madison, Wis.

Part of Degradation of Synthetic Organic Molecules in Biosphere, Proc. Conf., 1971, (190-205); 1972

REVIEW; PESTICIDES; RESISTANCE; SOILS; VOLATILIZATION; CROPS; MICROORGANISMS; DEGRADATION

A review on facotrs which affect the fate of pesticides in soil, such as volatization, soil cultivation, cover crops, water content, cover crops, water content, soil microorganisms, and so forth. (27 references)

644

Persistence and Fate of Pesticides in Soils, Water, and Crops. Significance to Humans

Lichtenstein, E.P.; Dep. Entomol., Univ. Wisconsin, Madison, Wi

Part of Pesticide Chemistry, Proc. Second Int. Congr. Pesticide Chemistry, 1972, 6, (1-22); 1972

REVIEW; PESTICIDES; HUMANS; SOILS; WATER; CROPS; ABSORPTION; RESIDUES; PHARMACOLOGY; BIOLOGICAL SYSTEMS

A review, with 30 references, on the properties of pesticides in soils and absorption of the residues by crops. The pharmacological significance of pesticidal residues and other environmental pollutants in human or other biological systems is discussed.

645

Environmental Factors Affecting Penetration and Translocation of Insecticides from Soils into Crops

Lichtenstein, E.P.; Dep. Entomol., Univ. Wisconsin, Madison, Wi

Part of Qual. Plant. - Plant Foods Hum. Nutr.(QLPLAN) 1973, 23(1-3) 113-18; 1973

REVIEW; INSECTICIDES; METABOLISM; TRANSLOCATION; CROPS; PENETRATION; TRANSLOCATION; SOILS

646

Increase of Persistence and Toxicity of Parathion and Diazinon in Soil with Detergents

Lichtenstein, E.P.

J. Econ. Entomol., 59(4), 985-993; 1966

PERSISTENCE; PARATHION; DIAZINON; SOILS; DETERGENTS

647

Movement of Insecticides in Soils Under Leaching and Non-Leaching Conditions

Lichtenstein, E.P.; Department of Entomology, University of Wisconsin, Madison

J. Econ. Entom., 51, 380-383; 1959

MOVEMENT; INSECTICIDES; SOILS; LEACHING; TRANSPORT; ALDRIN; LINDANE; DDT; PESTICIDES; TRACER; PHOSPHORUS 32; RADIONUCLIDES; PLAINFIELD SAND; PARATHION

648
Effect of Sterilizing Agents on Persistence of Parathion and Diazinon in Soils and Water

Lichtenstein, E.P.; Fuhremann, T.W.; Schulz, K.R.

J. Agr. Food Chem., 16(5), 870-873; 1968

PERSISTENCE; PARATHION; DIAZINON; SOILS; WATER; STERILIZING AGENTS

649
Persistence and Vertical Distribution of DDT, Lindane, and Aldrin Residues 10 and 15 Years After a Single Soil Application

Lichtenstein, E.P.; Fuhremann, T.W.; Schulz, K.R.; Wisconsin University, Madison, Wi

J Agric Food Chem 19 (4). 1971 718-721.; 1971

HOUSE FLY; FOOD; CROPS; DICOFOL; DDE; PHOTODIELDRIN; INSECTICIDES; SILT LOAM; DDT; ALDRIN; LINDANE; DIELDRIN

In field experiments a Miami silt loam was treated with DDT (85% p,p'-DDT + 15% o, p'-DDT) or lindane at 10 and 100 lb/acre and with aldrin at 2 and 20 lb/acre and a Carrington silt loam was treated with DDT or aldrin at 4 lb/acre. 15 years after the application of DDT at 10 or 100 lb/acre, 18 and 24%, respectively of the applied dosages were present in the top 6 inchs of soil in the form of p,p'-DDT, o,p'-DDT and p,p'-DDE. Dde was the major metabolite but dicofol was also detected. 5.8% of the aldrin applied at 20 lb/acre was recovered mainly as dieldrin but photodieldrin (0.2% of applied dosage) was also detected. Only 0.2% of the lindane applied at 10 and 100 lb recovered after 15 years. Although the insecticides were worked in to a depth of 5 inches, the 6-9 inch soil layer 10 years later contained about 30 and 18% of the total DDT and aldrin residues recovered, respectively.

650
Effects of Field Application Methods on the Persistence and Metabolism of Phorate in Soils and its Translocation into Crops

Lichtenstein, E.P.; Fuhremann, T.W.; Schulz, K.R.; Liang, T.T.; Dep. Entomol., Univ. Wisconsin, Madison, Wi

J. Econ. Entomol.(JEENAI), 66(4), 863-6; 1973

PHORATE; RESIDUES; SOILS; CORN; CARROTS; INSECTICIDES; ORGANOPHOSPHATES; CROPS; TRANSLOCATION; METABOLISM; APPLICATION; PERSISTENCE; POTATOES; PHORATE SULFONE

Within 6 days after a soil surface application of phorate (10 lg/acre), only half of the applied dosage could be detected in the soil, whereas 30 days were required for the same amount of phorate to be removed from the soil following phorate incorporation into the upper 4-5 inches of soil. No phorate residues were detected in potatoes grown in these soils, but phorate sulfone was detected in corn silage (0.03-0.13 ppm) and carrots (0.04-0.50 ppm) over 2 growing seasons.

651
Effects of a Cover Crop Versus Soil Cultivation on the Fate and Vertical Distribution of Insecticide Residues in Soil 7 to 11 Years After Soil Treatment

Lichtenstein, E.P.; Schultz, K.R.; Fuhremann, T.W.; Entomology Department, Wisconsin University, Madison, Wisconsin

Pestic. Monit. J., 5(2), 218-222; 1971

ALDRIN; HEPTACHLOR; REDUCTION; INSECTICIDES; RESIDUES; LUCERNE; COVER CROP; CROPS; VERTICAL DISTRIBUTION

Eleven years after the application of aldrin and heptachlor to the top 4-5 inches of soil, soil cultivation had caused a 76-82% greater reduction of insecticide residues than in the no-cultivation (lucerne) treatment. Of the aldrin-dieldrin residues recovered from uncultivated soils, 52% were in the top 2 inches, 32% in the 2-4 inch layer and 5% in the 6-9 inch layer. Equivalent figures for heptachlor treated soils were 26, 52 and 6.5% respectively.

652
Residues of Aldrin and Heptachlor in Soils and Their Translocation into Various Crops

Lichtenstein, E.P.; Schulz, K.R.

J. Agr. Food Chem., 13(1), 57-63; 1965

RESIDUES; ALDRIN; HEPTACHLOR; SOILS; TRANSLOCATION; CROPS

653
Movement and Fate of Dyfonate in Soils Under Leaching and and Nonleaching Conditions

Lichtenstein, E.P.; Schulz, K.R.; Fuhremann, T.W.; Dep. Entomol., Univ. Wisconsin, Madison, Wis.

J. Agr. Food Chem.(JAFCAU) 1972, 20(4) 831-8; 1972

DYFONATE; SOILS; INSECTICIDES; TRANSPORT; ORGANOPHOSPHATES; DEGRADATION

Sixty and 28% of the ^{14}C-labeled dyfonate found in the treated plano silt loam 1 day after its application was recovered as iNTAct dyfonate after 29 and 105 days of incubation, respectively. The loss of ^{14}C occurred by volatilization of the ethoxy moiety of the molecules after dyfonate degradation in the soil. The movement of a pesticide through soil with water was soly. -dependent and a function of the soil type, as indicated by studies in sandy loam, quartz sand, and plainfield sand. The insecticide was also degraded and moved into untreated soil in the absence of water, but to a lesser extent.

654
Movement and Fate of Dyfonate in Soils under Leaching and Nonleaching Conditions

Lichtenstein, E.P.; Schulz, K.R.; Fuhremann, T.W.; Dep. Entomol., Univ. Wisconsin, Madison, WI

J. Agr. Food Chem., (JAFCAU), 20(4), 831-838; 1972

MOVEMENT; FATE; DYFONATE; SOILS; LEACHING; INSECTICIDES; TRANSPORT; ORGANOPHOSPHORUS INSECTICIDES; CARBON 14; TRACER

655
Kinetics of Heterogeneous Chemical Reactions. A Theoretical Model for the Accumulation of Pesticides in Soil

Lin, S.H.; Eyring, H.

Proc Nat Acad Sci USA 68 (4). 1971 777-780.

LAPLACE TRANSFORM METHOD; SOILS; MODEL; KINETICS; THEORETICAL MODEL; ACCUMULATION; PESTICIDES

656
2,4-D Diffusion in Saturated Soils: A Mathematical Theory

Lindstrom, F.T.; Boersma, L.; Gardiner, H.

Soil Sci., 106(2), 107-113; 1968

2,4-D; DIFFUSION; SOILS; MATHEMATICAL THEORY; THEORY

657
Degradation of Herbicides and Fungicides by Soil Microorganisms

Lingens, F.; Inst. Mikrobiol. Molekularbiol., Univ. Hohenheim, Stuttgart, Germany

Chimia (CHIMAD), 27(12), 628-635; 1973

REVIEW; HERBICIDES; DEGRADATION; MICROORGANISMS; FUNGICIDES; SOILS

A review was presented on the mechanism of degradation of some herbicides and fungicides by microorganisms, the occurrence of these microorganisms in the various taxonomical groups, and their potential to degrade natural and foreign substrates. (47 references)

658
Decomposition of Aromatic Compounds by Soil Micro-Organisms, with Special Reference to Herbicides

Lingens, F.; Universitat Hohenheim, Stuttgart, German Federal Republic

Sonderheft Zeitschrift fur Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz, 6, 35-42; 1972

SOILS; DECOMPOSITION; AROMATIC COMPOUNDS; MICROORGANISMS; HERBICIDES; REVIEW

A review, with 35 references.

659
Breakdown of Herbicides and Fungicides by Soil Microorganisms

Lingens, F.; Univ. Hohenheim, Inst. fuer Mikrobiol. und Molekularbiol., Stuttgart, Germany

Chimia 27(12), 628-635; 1973

BREAKDOWN; HERBICIDES; FUNGICIDES; PYRAZON; PYRAMINE; MICROORGANISMS; 2-PYRONE-6-CARBOXYLIC; PYROCATECHOL DERIVATIVE; 5-AMINO-4-CHLORO-2-(2,3-CIS-DIHYDROXYCYCLOHEXA-4, 6-DIENE-1-YL)-3(2H)-PYRIDAZINONE; PHENOXYACETIC ACIDS; PHENOL; SOILS; DECOMPOSITION; REVIEW

Studies on the biochemical mechanism of the breakdown of herbicides and fungicides by soil microorganisms are reviewed. Pyrazon, the active agent of pyramine, is metabolized by soil microorganisms into 2-pyrone-6-carboxylic acid through intermediates such as a pyrocatechol derivative and 5-amino-4-chlor-2-(2,3-cis-dihydroxycyclohexa-4, 6-diene-1-yl)-3(2H)-pyridazinone. Phenoxyacetic acids are first decomposed by soil microorganisms by removal of the aliphatic side chain, after which the phenol thus formed is converted into a pyrocatechol derivative. Gradual substitution of the nitro groups, liberation of nitrites, and metabolism into a trihydroxy compound was observed during the breakdown of 3,5-dinitro-o-cresol (DNOC) by ARTHROBACTER SIMPLEX. Dealkylation and reduction of trifluralin by BACTERIODES RUMINICOLA ssp. brevis and LACHNOSPIRA MULTIPARUS was evidenced. Removal of the side chain, release of carbon monoxide, hydrolysis, and nitrogen dealkylation of s-triazines in the soil were observed. Linuron is believed to be decomposed into 3,4-dichloro-aniline, methoxymethylamine, and carbon dioxide in the soil. Slow breakdown of o-toluanilide and 2,5-dimethyl-furan-3-carboxanilide by NOCARDIA spp. in the soil was observed. (47 references)

660
Adsorption of Ametryne and Diuron by Soils.

Liu, I.C.; Cibes-Viade, H.; Koo, F.K.S.; Agricultural Experimental Station, University Puerto Rico

Weed Sci., 18, 470-474; 1970

ADSORPTION; AMETRYNE; ORGANIC MATTER; SOILS; SILT; PH; DIURON; CATION-EXCHANGE CAPACITY; TEMPERATURE; PESTICIDES

Adsorption of ametryne in Puerto Rican soils was positively correlated with organic matter and silt content, but negatively correlated with pH. Adsorption of diuron was correlated with organic matter, cation-exchange capacity, magnesium content and soil texture. Generally diuron was adsorbed to a greater degree than ametryne. Temperature had a greater effect on, and pH had less effect on adsorption of diuron than ametryne.

661
Adsorption of Fluometuron, Prometryne, Sencor and 2,4-D by Soils

Liu, L.C.; Cibes-Viade, H.R.; Agric. Exp. Stn., Univ. Puerto Rico, Rio Piedras, Puerto Rico

J. Agr. Univ. P. R.(JAUPA8) 1973, 57(4) 286-93; 1973

HERBICIDES; SOILS; ADSORPTION; SENCOR; FLUOMETURON; DICHLOROPHENOXYACETATE; PROMETRYNE; 2,4-D

The adsorption of 4 herbicides by 48 soil types was determined. The average percent adsorption for all soil types was prometryne (37.0%), sencor 23.0%, fluometuron 22.6%, and 2,4-D 12.4%.

662
Persistence of Several Herbicides in a Soil Cropped to Sugarcane-M

Liu, L.C.; Cibes-Viade, H.R.; Gonzalez-Ibanez, J.

J Agric Univ P R 55 (2). 1971 147-152.

BIOASSAY; AMETRYNE; DIURON; FLUOMETURON; NOREA; PROMETRYNE; TERBACIL; HERBICIDES; SOILS; PERSISTENCE

663
The Persistence of Atrazine, Ametryne, Prometryne and Diuron in Soils Under Greenhouse Conditions

Liu, L.C.; Cibes-Viade, H.R.; Gonzalez-Ibanez, J.; Univ. P.R., Rio Peidras

J Agr Univ P R, 54(4), 631-635; 1970

PLANTS; HERBICIDES; MICROBIAL DETOXIFICATION; BIOASSAY; PERSISTENCE; DIURON; AMETRYNE; ATRAZINE; PROMETRYNE; SOILS

Avena sativa bioassay data for 13 soils showed the persistence of herbicides to be in the order: diuron greater than ametryne greater than atrazine greater than prometryne. The degree of persistence was lower in soils of high organic matter content, possibily due to greater microbial detoxification.

664
Adsorption of Atrazine and Terbacil by Soils

Liu, L.C.; Cibes-Viade, H.R.; Koc, F.K.S.; Agric. Exp. Stn., Univ. Puerto Rico, Mayaguez, P. R.

J. Agr. Univ. P. R. (JAUPA8),, 55(4), 451-60; 1971

ADSORPTION; ATRAZINE; TERBACIL; SOILS

The adsorption of atrazine was consistently higher than terbacil in 34 Puerto Rican soils and the adsorption percentage was 4-6 times higher for both herbicides in Cano Tiburones muck soil than in all other soils. The adsorption of atrazine was positively correlated with the sand content. The adsorption of ii was pos. Correlated with the cec, the soil pH, and with th The adsorption of ii was pos. Correlated with the cec, the soil pH, and with the content of n (006) phosphorus, (012) caclium, mg, and clay, but neg. Correlated with the sand content.

665
Metabolism of Carbaryl by a Soil Fungus

Liu, S.Y.; Bollag, J.M.

J Agr. Food Chem., 19(3), 487-490; 1971

MASS SPECTROSCOPY; THIN LAYER CHROMATOGRAPHY; INSECTICIDES; DEGRADATION; DETOXIFICATION; REACTIONS; METABOLISM; CARBARYL; FUNGUS; MICROORGANISMS

In a medium containing methyl-C14 carbaryl, GLIOCLADIUM ROSEUM isolated from a soil treated with carbaryl for 4 weeks metabolized carbaryl into 1-naphthyl N-hydroxymethylcarbamate, 4-hydroxy-1-naphthyl methylcarbamate, and 5-hydroxy-1-naphthyl methylcarbamate. The radioactivity of the growth medium decreased.

666
Carbaryl Decomposition of 1 Naphthyl Carbamate by Aspergillus-Terreus

Liu, S.Y.; Bollag, J.M.

Pest Biochem Physiol 1 (3-4). 1971 366-372.

INSECTICIDES; CARBARYL; DECOMPOSITION; 1 NAPHTHYL CARBAMATE

667

Evaporation of DDT

Lloyd-Jones, C.P.

Nature, 229(5279), 65-66; 1971

VAPOR PRESSURE; GASEOUS DIFFUSION COEFFICIENT; STILL AIR LAYER; RADIOASSAYS; RADIOACTIVITY; CROPS; CARBON 14; VOLATILIZATION

The evaporation rate of the uniformly ring-labeled 14-C-DDT was investigated and compared to the calculated rates. Calculating the rate from the relation between the vapor pressure, the gaseous diffusion coefficient and the still air layer thickness, DDT should evaporate at the rate of 0.003 mCg/sq cm/hr at 20 degrees C and at 0.002 mCg/sq cm/hr at 5 degrees C. Another method of calculating the rate using the relation between the rate of loss, the product of vapor pressure and the square root of the molecular weight results in a rate of 0.002 mCg/sq cm/hr. The labeled DDT (0.5 mCg/sq CM) was applied in ethanol to 3.8-sq cm aluminum planchets. During 53 days in a well-ventilated room away from direct sunlight, radioassays revealed that the counts steadily decreased from the initial value of about 160 to 10 cps. When maintained outdoors in a Stevenson's screen for 43 days when the average maximum and minimum temperatures were 7.0 and 1.3 degrees C, the count declined from 200 to 80 CPS. The mean rates of loss in these two experiments were 0.002 mCg/sq cm/hr and 0.0003 mCg/sq cm/hr, respectively. The same amount of DDT was placed in enamelled metal dishes and exposed continuously to blowing air (about 10 mph) for 14 days. Recoveries were between 26 and 33% of the control, equivalent to 0.001 mCg/sq cm/hr. A fourth experiment designed to recover the volatilized radioactivity, revealed that inverted untreated planchets acquired radioactivity with a mean count of 20 CPS after 14 days at 20 degrees C. The experimentally determined evaporation rates, in good agreement with the calcualted values, are equal to about 2 lb/acre/yr in the summer and about 0.3 lb/acre/yr in the winter. About 1/2 of the DDT applied to field crops may enter the atmosphere. (8 references)

668

Metabolism of Phenoxy Herbicides by Plants and Soil Micro-Organisms

Loos, M.A.; Dep. Microbiol. Plant Pathol., Univ. Natal, Pietermaritzburg, South Africa

Part of Pesticide Terminal Residues, International Symp., 1971 (291-304); 1971

REVIEW; HERBICIDES; METABOLISM; PHENOXY ALKANOIC ACIDS; PLANTS; SOILS; MICROORGANISMS

A review and discussion with 116 references of the metabolism of phenoxyalkanoic acids by plants and soil microorganisms.

669

Mobilization by Water of 14-C-DDT Retained by Homoionic Clays

Lopez-Gonzalez, J.D.; Gonzalez, G.C.

Anales Quim., 66(3), 271-82; 1970

PESTICIDES; DDT; RAIN FALL; IRRIGATION WATER; CLAY; BENTONITE; KAOLIN; SEPIOLITE; VERMICULITE; MERCK SILICA GEL; ETHANOL; BENZENE; WATER BATH; LEACHING; SOLUBILITY; TRANSFORMATION

The retention of pesticides (in particular, DDT) by soil mineral constituents was investigated with emphasis on the problem of how rain and irrigation water might mobilize pesticide molecules, displacing them to greater depths or removing them from the cultivation medium. Natural clays (150-microgram particle size) and their corresponding laboratory-prepared acidic and calcic homoionic forms were tested. The clays were: bentonite, kaolin, sepiolite, vermiculite and Merck silica gel. Their cation exchange and specific surface values are tabulated. The labeled P,P'-DDT was obtained commercially and recrystallized several times in ethanol. It was calculated that 1 mg P,P'-DDT will cover about 2.46 sq miles of soil. One grade of each of the test clays received a volume of DDT previously calculated from a benzene solution of 14-C-DDT with a specific activity of 49.02 mCCi/g and of a known concentration. The quantities of DDT added to bentonite, kaolin, sepiolite, vermiculite and merck silica gel were 16.04, 2.35, 57.84, 6.29 and 59.23 mg, respectively. Benzene was evaporated from all the samples in a water bath (40 degrees C), agitating the system for the best distribution of the DDT on the clay surfaces. The ten intermediate extraction steps are detailed. The radiochemical procedure previously reported was used in the subsequent analysis. The results showed that the amount of DDT recovered from the several clay samples depended mainly on three factors: 1) the leaching of DDT jointly with some collodial fraction in the clay, 2) an increase in the solubility of DDT caused by the presence of inorganic ions (a synergistic effect), and 3) the transformation of DDT into other substances of higher solubility (DDE and TDE). The leaching of DDT from homoionic calcic clays appeared to occur more readily than from homoionic acidic ones. The results for each individual clay are graphically presented. (26 references)

670

Isolation of Microorganisms from a Texas Soil Capable of Degrading Urea Derivative Herbicides

Lopez, C.E.; Kirkwood, J.I.; Sch. Agric., A. and M. Univ., Prairie View, TX

Soil Sci. Soc. Amer., Proc., 38(2), 309-312; 1974

SOILS; HERBICIDES; MICROORGANISMS; UREA; MONURON; DIURON; DEGRADATION

671

Accumulation of Simazine in Mulch Residue Under Apple Trees and Its Effect on Apple Rootstocks and Soil Micro-organisms.

Lord, W.J.; Gunner, H.B.; Robinson, D.E.; University of Massachusetts, Amherst

Horticultural Science, 5(4), 261-262; 1970

SIMAZINE; MULCH; SOILS; BACTERIA; FUNGI; MICROORGANISMS; ACTINOMYCETES; PERSISTENCE; TREES; APPLE TREES; PLANTS; RESIDUES

Mulch and soil samples were collected from a block of apple trees which had been treated with hay mulch or nonperforated black polyethylene mulch, 3.2 lb of 4% granular (G) simazine/acre or 3.2 lb of 80% wettable powder (WP) simazine/acre only or hay mulch or plastic mulch plus 3.2 lb of G or WP simazine. Most of the simazine remained in the mulch layer and unmulched soil contained more simazine than did mulched soil. Both WP and G formulations in the presence of hay mulch had little effect on the microbial counts. The number of bacteria, fungi and actinomycetes in G simazine treated soil increased in the spring but the stimulating effect did not persist till autumn.

672

Persistence and Movement of Picloram and 2,4,5-T (2,4,5-Trichlorophenoxyacetic Acid) in Soils

Lutz, J.F.; Byers, G.E.; Sheets, T.J.; North Carolina State Univ., Raleigh, NC

J. Environ. Qual.@(JEVQAA), 2(4), 485-8; 1973

SOILS; PICLORAM; TRICHLOROPHENOXYACETATE; HERBICIDES; LEACHING; WATER; WATERSHEDS; 2,4,5-T; PENETRATION; PERSISTENCE; RATE; MOVEMENT

When applied to a watershed at 2.24 kg/ha, picloram was more persistent than was 2,4,5-T. Approximately 60% of the picloram and 90% of the 2,4,5-T disappeared in 15 days. There was some penetration into the soil, but a very high percentage of the total amount present was in the 0-7.5-cm layer. Doubling the application rate resulted in a 2-4 fold increase in the amount of herbicide recovered. Very little downslope movement occurred, even though the average slope of the plots was approximately 27%. More picloram than 2,4,5-T moved.

673

Role of Photo Sensitizers in Alteration of Pesticide Residues in Sun Light

Lykken, L.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. Oiso, Japan, October, 1971. Academic Press: New York, N.Y., U.S.A.; London, England. (p. 449-469) 637 p.; 1972

PHOTO SENSITIZERS; PESTICIDES; RESIDUES; SUN LIGHT

674

Chemical Control of Pests

Lykken, L.; Division of Entomology and Acarology, University of California, Berkeley, CA

Part of Giddings, J.C. (Ed.), Monroe, M.B. (Ed.), Our Chemical Environment, Canfield Press, San Francisco, CA (p. 165-72) 367 p.; 197

INSECTICIDES; PESTICIDES; ARSENIC; ARSENICALS; COPPER; MERCURY; ROTENONE; PYRETHRUM; CHLORINATED HYDROCARBONS; DDT; BENZENE HEXACHLORIDE; TOXAPHENE; ALDRIN; HERBICIDES; NEMATOCIDES; FUNGICIDES; PERSISTENCE; TETRAETHYL PYROPHOSPHATE; TEPP; PARATHION; ENDRIN; HISTORICAL TRENDS; MALATHION; LEAD ARSENATE; METHOXYCHLOR; PIPERONLY BUTOXIDE; MALARIA; VIRAL ENCEPHALITIS; ROCKY MOUNTAIN FEVER; TULAREMIA; VOLATILITY; HYDROLYSIS; PHOTODEGRADATION; OXIDATION METABOLISM; SOLUBILITY; RESIDUES; BIRDS; EGGSHELL THICKNESS; FISH; FOOD CHAINS; DEGRADATION; BIODEGRADATION; FATE; HEALTH HAZARDS; FOOD; FEEDS; CARCINOGENS; CHOLERA; ORGANOPHOSPHATES

This is a summary of pesticides, their usages, benefits, persistence, and some hazards associated with them. Until the late 1940's arsenicals, compounds of copper and mercury, and some plant derived materials (rotenone, pyrethrum) were used as pesticides. Beginning in the late 1940's chlorinated hydrocarbons took over; somewhat later herbicides were developed. These new pesticides have been economical and effective. They often give an inpresive increase in crop yield and quality , thus decreasing unit production costs and conserving labor and plant nutrients. In some areas several insect-borne diseases (malaria, viral encephalitis, cholera, Rocky Mountain fever, tularemia) have been more or less controlled mainly by the use of persistent insecticides with a considerable saving of human life and resource (debilitating diseases). The trend has been toward chemicals that are less toxic to man and useful animals, and toxic to selected insect species only, often resistant species. Also, there has been a trend toward compounds that degrede quickly after their work is done. Pesticide chemicals vary greatly in toxicity to man and animals. Some (tetraethyl phosphate (TEPP), parathion, endrin, and others are extremely or highly toxic), but most are only moderately toxic, and some are practically nontoxic. DDT has been studied and used extensively, but no harm to man, nor harm to man or animals from residues in foods or feeds has resulted. However, as a result of wide spread usage it has built up in birds (particularly in fat) and caused eggshells to be thin, which resulted in reproductive failure; some fish kills have also resulted. Once they build up to a certain equilibrium concentration any excess is usually metabolized or excreted. DDT is quite persistent and 10-20 percent may remain after 10 years in moist soil and 50 percent in dry soils. In view of the benefits of pesticides, some adverse effects and risks may have to be tolerated, but these should be minimized as much as possible by development and possibly by alternative, safer approaches to pest control. Adverse effects should be minimized by safe practices, following instructions, keeping them away from children, etc.

675
Metabolic Fate of Dithane M-45. Coordination Product of Zinc Ion and Manganous Ethylenebisdithiocarbamate

Lyman, W.R.; Rohm And Haas Co., Philadelphia, Pa.

Part of Pesticide Terminal Residues, International Symp., 1971 (243-56); 1971

REVIEW; DITHANE; THIOCARBAMATE; FUNGICIDES; DEGRADATION; METABOLISM

A review of the degradation and metabolism of Dithane M-45 in water, in plants, and in animals.

676
Regulations for Polychlorocamphene Use in Agriculture and Content of It in Soil and Plants

Lyubenko, P.K.; Stefanskii, K.S.; Rozenfil'd, A.A.; Vses. Nauchno-Issled. Inst. Gig. Toksikol. Pestits., Polim. Plast. Mass, Kiev, USSR

Khim. Sel. Khoz. (KSKZAN), 11(12), 908-909; 1973

CHLOROCAMPHENE; RESIDUES; REGULATION; INSECTICIDES; PCC; CAMPHENE

677
Organochlorine Insecticide Residues in Soil and Absorption by Crops

Machimura, N.; Masuda, K.

Hokoriku Byogaichu Kenkyo Kaiho, Prooc. Soc., 20, 71-75; 1972

ORGANOCHLORINE INSECTICIDES; DEGRADATION; UPTAKE; PLANTS; ALDRIN; ENDRIN; DIELDRIN; HEPTACHLOR EPOXIDE; VIRGIN CLAY; CALCIUM HYDROXIDE; PH; VEGETABLES; CROPS; WATER; PADDIES; INSECTICIDES; SOILS; HEPTACHLOR

The effects of various treatments on the degradation rates of organochlorine insecticides in soil and their uptake by plants were investigated. Aldrin, endrin, dieldrin, and heptachlor epoxide were mixed with sterilized or unsterilized virgin clay soil. A mature compost mixture was added to some specimens at 0.5-40 kg/m(2). The pH of some specimens was adjusted to 5-9 with calcium hydroxide. Soil lots were potted in 0.2M(2) surface area wagner pots and left fallow or sown with vegetable crops. Planted pots were watered every 10 days; in some unplanted pots the water level was kept 3-5 cm above the soil surface to simulate flooded paddy fields. Pots were kept outdoors for 90-200 days. The degradation rate in flooded soils was highest for aldrin, followed by endrin and dieldrin, with heptachlor epoxide far behind; degradation in non-flooded soils was 2-4 times slower. The insecticides were generally degraded more rapidly in unsterilized than in sterilized soil. About 7-8% of the chemical present was taken up by crops from untreated soil, 5-9% in sterilized soil, and uptake decreased with increasing amount of compost added. Effects of pH on degradation were equivocal. (9 references)

678
Interaction Between Insecticides and Soil. Microbiological Assay of Sevin and Meta-Iso-Systax Using Bacteria as Test Organisms

Mahmoud, S.A.; Abo-Elghar, M.R.; Zaki, M.M.; El-Huseiny, T.M.; Fac. Agric., Ain Shams Univ., Cairo, UAR

Zentralbl. Bakteriol., Parasitenk., Infektionskr. Hyg., Abt. 2(ZBPIA9), 124(7), 766-8; 1970

SOILS; INSECTICIDES; SEVIN; METAISOSYSTOX; CARBARYL

For the bacteriological determination of sevin and metaisosystox in soils, escherichia coli was best suited, displaying a sensitivity of 0.02-01 and 2-10 ppm, respectively. The rate of recovery from treated soils was 83-93 and 87-90%, respectively, being somewhat lower than that by the chemical method of R. Miskus.

679
Herbicides and Their Residues

Maier-Bode, H.

7479 p.; 1970

HERBICIDES; RESIDUES; REVIEW

A book

680
Persistence of Herbicides Following Their Application.

Maier-Bode, H.; Bonn Universitat, German Federal Republic

Sonderheft Zeitschrigt fur Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz, 6, 27-33; 1972

PERSISTENCE; HERBICIDES; TRANSPORT; SOILS; LEACHING; EVAPORATION; PHOTOLYSIS; DEGRADATION; DECARBOXYLATION; HYDROXYLATION; SAPONIFICATION; DEALKYLATION; REVIEW

A discussion of factors affecting the transport of herbicides in soil (leaching, evaporation, photolysis) and of the mechanisms of their degradation (decarboxylation, hydroxylation, saponification, dealkylation, cleavage of the NH-CO bond). (27 references)

681

Analysis of Phenthiuram

Makarova, S.V.; Eliseeva, N.A.; Vses. Nauchno-Issled. Inst. Khim. Sredstv Zashch. Rast., Moscow, USSR

Khim. Sel. Khoz.(KSKZAN), 10(9), 680-2; 1973

ANALYSIS; PHENTHIURAM; TMTD; DETERMINATION; LINDANE; COPPER; TRICHLOROPHENOLATE; SEEDS DISINFECTANT; SEEDS; DISINFECTANT; GAMMA HCH; TCPC; PHOSPHORIC ACIDS; TETRASODIUM EDTA; CESIUM; POTASSIUM HYDROXIDE; METHYL HYDROXIDE; ABSORPTION; XANTHATE; TITRATION; IODINE; EXTRACTION; HYDROLYSIS; PETROLEUM; PETROLEUM ETHER; ETHER; DICHETRIC DETERMINATION; ACIDS; COMBUSTION; RESIDUES; MINERALIZATION; CHLORINE

A method was developed for the determination of the seed disinfectant, phenthiuram, which is a mixture of TMTD, gamma-HCH, and copper 2,4,5-trichlorophenolate (TCPD). TMTD was determined after decomposition of phenthiuram, by H3PO4 in the presence of tetrasodium EDTA, to cs2, which was absorbed in KOH/MeOH, and the generated xanthate was titrated with iodine. The gamma-HCH was determined via a preliminary extraction with petroleum ether and subsequent hydrolysis of the chlorine groups. The content of TCPC was determined via iodometric determination of the copper produced by mineralization and treatment of the combustion residue with acid.

682

Investigations on Various Factors Affecting the Decomposition of Methylbromide (Terabol) in Fumigated Soils and Vegetation.

Malkomes, H.P.; Technische Universitat, Hannover, W. Germany

Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz, 78(8), 464-476; 1971

DECOMPOSITION; TEREBOL; METHYLBROMIDE; SOILS; VEGETATION; FUMIGATION; SILT; ORGANIC MATTER; SOIL MOISTURE; PEAT; LEACHING; COMPOST; TEMPERATURE; PLANTS

Laboratory, glasshouse and field studies with different substrates (peat, soil + compost, perlite) showed that increasing amounts of silt and organic matter and a higher temperature (20 C versus 10 C) enhanced the decomposition of CH3Br and the consequent release of Br into the substrate. Decomposition was more rapid in light than in heavy soils and under dry than under moist conditions. In soils and in moist peat, liquid CH3Br resulted in greater Br residues than did gaseous CH3Br. The addition of a peat cover stimulated Br production in glasshouse soils and resulted in greater difficulty in the removal of residual CH3Br by leaching.

683

Effects of Diazinon Contamination on an Old-Field Ecosystem

Malone, C.R.

The American Midland Naturalist, 82(1), 1-27; 1969, July

INSECTICIDES; PESTICIDES; FLORA; FAUNA; PLANTS; ANIMALS; INSECTS; SOIL MICROARTHROPOD; DETRITUS; NUTRIENT CYCLING; DIAZINON; OLD FIELD ECOSYSTEM

684

Role of Soil and Plants in Inactivation of Simazine and Atrazine

Manorik, A.V.; Malichenko, S.M.; Inst. Fiziol. Rast. Akad. Nauk Ukrain. SSR, Kiev

Agrokhimiya No. 9, 114-119; 1970

SOILS; DECOMPOSITION; FLOWERING PLANTS; ATRAZINE; SIMAZINE; CHERNOZEM; TRIAZINE; PLANTS; HERBICIDES; RHIZOSPHERE

In pot experiments, atrazine and simazine decomposed slowly in a podzolized chernozem and a gray podzolized soil. Simazine was inactivated more quickly in the chernozem, but inactivation of triazine was not affected by soil type. Inactivation was effected by soil micro-organisms and plants, particularly the former. Plants, particularly when flowering, took up considerable amounts of the herbicides. Decomposition of atrazine and simazine was more rapid in the rhizosphere than it was in uncropped soil.

685

Effect of Sym Triazines on the Activity of Phosphatase and Urease in Soil

Manorik, A.V.; Malichenko, S.M.

Fiziol Biokhim Kul'T Rast 1 (2). 1969 Trans 173-176.

SYM TRIAZINES; PHOSPHATASE; UREASE; ATRAZINE; SIMAZINE; PROMETRYNE; HERBICIDES; SOILS; TRIAZINE

686

Movement and Absorption of Pesticides in Sterilized Soil Columns

Mansell, R.S.; Hammond, L.C.; Florida Univ., Gainesville. Water Resources Research Center

Florida Univ., Gainesville. Water Resources Research Center, PB 204 644; Rept. No. WRRC-PUB-16; Contract DI-14-31-0001-3209; Monitoring Agency Rept. No. W72-01697, OWRR-A-013-FLA(3); Proj. OWRR-A-013-Fla; 9, 68 p.; 1971, August

ABSORPTION; MOVEMENT; SOILS; AGRICULTURE; SOIL CHEMISTRY; SOIL PROPERTIES; PYRIDINE; CHLORINE ALIPHATIC COMPOUNDS; SYSTEMIC HERBICIDES; SOIL STERILANT HERBICIDES; PARAQUAT HERBICIDE; BIPYRIDINIUM; HERBICIDES; WEED CONTROL; GROUND WATER; WATER; 2,4-D 2-4-DICHLOPHENOXY ACETIC ACID; SOIL COLUMNS

687

Movement of Acarol and Terbacil Pesticides During Displacement Through Columns of Wabasso Fine Sand

Mansell, R.S.; Wheeler, W.B.; Elliott, L.; Shaurette, M.; Dept. of Soil Science, Institute of Food and Agricultural Science, Gainesville, FL

Soil Crop Sci. Soc. Fla., Proc. (SCSPAD), 31, 239-243; 1972

TERBACIL; SOILS; MOVEMENT; ACAROL; PESTICIDES; ADSORPTION; SAND; ACARICIDES; MOBILITY

Movement of acarol acaricide through Wabasso fine sand soil was negligible, whereas the herbicide terbacil moved through the soil at nearly the same rate as 36Cl (from Na36Cl). The elution curves indicated that there was some adsorption of the terbacil, especially by the surface soil samples.

688

Decomposition of Endosulfan by Soil Microorganisms

Martens, R.; Inst. Bodenbiol., Forschungsanst. Landwirtsch., Brunswick, Ger.

Schriftenr. Ver. Wasser-, Boden-, Lufthyg., Berlin-Dahlem(SVWLAE) 1972, No. 37, 167-73; 1972

ENDOSULFAN; METABOLISM; SOILS; MICROORGANISMS; ENDODIOL; SULFATE; DECOMPOSITION; DEGRADATION; ENDOETHER; ENDOSULFAN; ENDOHYDROXYETHER; CHLORENDIC ACID; ENDOLACTONE; ACTINOMYCETES; HYDROLYSIS; PH; CARBON DIOXIDE; CHERNOZEM

The degradation of endosulfan by soil microorganisms was studied in test cultures and in different soil types in laboratory experiments using C 14-labeled endosulfan in concentrations up to 1,000 ppm. Endodiol, endosulfate, endoether, alpha- and beta-endosulfan, endohydorxyether, chlorendic acid, and endolactone were identified as the metabolites of endosulfan in soil cultures. Predominant endosulfate formation by fungi, predominant diol formation by bacteria, and rather uniform rates of formation of the different metabolites by actinomycetes were observed. The chemical hydrolysis of endosulfan at ph values over 7 may be inhibited by the soil microorganisms, and biological degradation becomes imporatnat first at pH values below 7. The rate of carbon dioxide formation in most of the soil investigated was ca. 0.3 to 0.5% in 15 weeks; CO2 formation rates of 2.9 and 5.4% were determined for a basic brown soil and a chernozem. The rate of sulfate formation during the same period was 30-60%. The rate of formation of polar metabolites in a tropical soil reached 11%.

689

Side Effects of Organic Chemicals on Soil Properties and Plant Growth

Martin, J.P.; Dep. Soil Sci. Agric. Eng., Univ. California, Riverside, Calif.

Org. Chem. Soil Environ.(26DJAE) 1972, 2, 73[illegible]-92; 1972

REVIEW; PESTICIDES; SOILS

A review with 377 references on the effect of pesticides on the physical chemical, and biological properties of soils. Stimulation and inhibition of plant growth following the application of pesticides to soil is discussed.

690

Decomposition and Transformations of Herbicides in Soils

Martin, J.P.; Ervin, J.O.; University of California, Riverside, CA

Part of Proceedings of the Annual Californian Weed Conference, 22, (83-108); 1970

HERBICIDES; SOILS; ADSORPTION; CLAY; HUMUS; PARTICLE SIZE DISTRIBUTION; PH; TEMPERATURE; DECOMPOSITION; TRANSFORMATION

The microbial processes affecting herbicides in soils are emphasized. The effects of herbicide adsorption on clay and humus, and of particle size distribution, soil pH and temperature on herbicide decomposition are discussed.

691

Microbial Activity in Relation to Soil Humus Formation

Martin, J.P.; Haider, K.

Soil Sci., 111(1), 54-63; 1971

HUMIC ACID; POLYMERS; PHENOL; PEPTIDES; AMINO ACIDS; POLYSACCHARIDES; LIGNIN; DEGRADATION; SOILS; HUMUS; MICROBIOLOGY

692

Residues of Organophosphorus Pesticides

Masuda, T.; Natl. Inst. Agric. Sci., Tokyo, Japan

Shokubutsu Boeki(SHBOAO) 1972, 26(3) 108-14; 1972

REVIEW; ORGANOPHOSPHORUS PESTICIDES; RESIDUE; SOILS; CROP ANALYSIS; REMOVAL; PESTICIDES

693
Studies on the Bioaccumulation and Microbial Degradation of 2,3,7,8-tetrachlorodibenzo-p-dioxin

Matsumura, F.; Benezet, H.J.; Dept. Entomol., Univ. Wisconsin, Madison, WI 53706

Environ. Health Perspect., 5, 253-258; 1973

TCDD; DDT; LINDANE; ZECTRAN; MODEL; PERSISTENCE; BIOACCUMULATION; TRANSLOCATION; PESTICIDES; ORGANIC SOILS; MICROORGANISMS; SAND; FISH; SHRIMP; MOSQUITO LARVAE; UPTAKE; INGESTION; BHC; MEXACARBATE; HEXACHLOROBENZENE; PESTICIDES; DIOXINS; MODEL ECOSYSTEM; TETRACHLORODIBENZODIOXIN; ORGANOCHLORINES

TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), DDT, lindane (gamma-BHC) and Zectran (mexacarbate) were tested in several model systems to determine their relative persistence and bioaccumulation. Vertical translocation of pesticides from sand to organic soil was least with TCDD (10%), moderate with DDT (35%), and greatest with Zectran (greater than 99%). Only 5 of 100 strains of microorganisms screened were able to degrade TCDD at all. Sand containing a deposit of pesticide was introduced into an aquarium containing invertebrates and/or fish. Shrimp and fish accumulated TCDD in extremely small amounts while mosquito larvae showed a surprisingly high rate of pick up. Uptake through ingestion of larvae was responsible for a considerable degree of concentration of TCDD, but not the other pesticides, in fish.

694
Degradation of Insecticides by a Soil Fungus, TRICHODERMA VIRIDE

Matsumura, F.; Boush, G.M.

J. Econ. Entomol., 61(3), 610-612; 1968

DEGRADATION; INSECTICIDES; SOILS; FUNGUS

695
Metabolism of Insecticides by Microorganisms

Matsumura, F.; Boush, G.M.; Dept. Entomol., Univ. Wisconsin, Madison, WI

Soil Biochem., 2, 320-336; 1971

INSECTICIDES; DEGRADATION; REVIEW; METABOLISM; LIPOPHILIC PROPERTIES; DDT; METABOLITES; DDE; TDE; EPOXIDATION; CYCLODIENE; ORGANOPHOSPHATES; CARBAMATES; OXIDATION; HYDROLYSIS; MICROORGANISMS; SOILS

Stable insecticides are most extensively altered by biological degradation systems, particularly microorganisms, in soil. A review of microbial metabolism of insecticides yields too little information on which to base a sound theory explaining such metabolism, but it is possible that their lipophilic properties allow penetration into the normally selective cell wall and that organisms surviving would be either tolerant to or able to degrade the foreign compound to a less toxic or more easily eliminated form. The most extensive studies on DDT metabolites have been involved with the production of DDE and TDE. Probably the best documented metabolic activity of soils has been the epoxidation of cyclodiene insecticides. Organophosphates and carbamates are readily degraded in soil by oxidation and hydrolysis; microorganisms contribute to this degradation. The ease with which insecticide-degrading microorganisms are found in frequently related to the overall stability of the pesticide. (63 refs)

696
Dieldrin. Degradation by Soil Microorganisms

Matsumura, F.; Boush, G.M.

Science, 156(3777), 959-61; 1967

DIELDRIN; DEGRADATION; SOILS; MICROORGANISMS

697
Malathion Degradation by TRICHODERMA VIRIDE and a PSEUDOMONAS Species

Matsumura, F.; Boush, G.M.

Science, 153(3741), 1278-1280; 1966

MALATHION; DEGRADATION; MICROORGANISMS; FUNGUS; SOILS

698
Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar

Matsumura, F.; Boush, G.M.; Misato, T.

Proceedings of a United States-Japan Seminar, Environmental Toxicology of Pesticides, 637 p.; 1972

FOOD; WATER; AIR; SOILS; BHC; BIODEGRADABLE PESTICIDES; RESIDUES; CHLORINATED HYDROCARBONS; INSECTICIDES; FUNGICIDES; HERBICIDES; ORGANOPHOSPHATES; CARBAMATES; DEGRADATION; RESIDUES; INDUSTRY; URBAN; MERCURY; ORGANOMERCURIALS

This book is concerned with environmental pollution caused by industrilization, urbanization and modern agricultural practices. The contributed papers discuss in detail the pesticide contamination of food, water, air and soil. It also examines the use of BHC in Japan and DDT in America, and proposes alternative methods of pest control, such as biodegradable pesticides, biological controls and nondetrimental chemicals. Several timely reviews of mercury pollution are included, with emphasis on the enviornmental hazards of organomercurial pesticides. The content is divided into 8 sections. The first section covers patterns of pesticide usage and occurrence of residues, followed by sections on mercury transformation in the environemnt and chlorinated hydrocarbon insecticides in the environment. Next, a section is included on fungicides, herbicides, organophosphates and carbamates, followed by a description of microbial influence on pesticide degradation. Part 6 discusses photodecomposition of pesticides, part 7 covers toxic effect of pesticide residues on wildlife, and the final section involves the design of new pesticides.

699
Breakdown of Dieldrin in the Soil by a Micro-Organism

Matsumura, F.; Boush, G.M.; Tai, A.

Nature, 219(5157), 965-7; 1968

BREAKDOWN; DIELDRIN; SOILS; MICROORGANISMS; DEGRADATION

700
Metabolism of Endrin by Certain Soil Microorganisms

Matsumura, F.; Khanvilkar, V.G.; Patil, K.C.; Boush, G.M.; Dep. Entomol., Univ. Wisconsin, Madison, Wis.

J. Agr. Food Chem.(JAFCAU), 19(1), 27-31; 1971

ENDRIN; SOILS; MICROORGANISMS; KETOENDRIN; METABOLITES; INSECTICIDES; BACTERIA; METABOLISM

Of greater than 150 microbial isolates from various soil samples, 25 were active in degrading the insecticide endrin. At least 7 endrin metabolites were isolated from a mass culture of pseudomonas, including 3 major metabolites. Most of the microbial metabolites of endrin were ketones and aldehydes with 5-6 Cl atoms. One metabolite, which occurred in all samples, was identified as ketoendrin.

701
Formation of Photodieldrin by Microorganisms

Matsumura, F.; Patil, K.C.; Boush, G.M.; Dep. Entomol., Univ. Wisconsin, Madison, Wis.

Science(SCIEAS), 170(3963), 1206-7; 1970

DIELDRIN; MICROBES; PHOTODIELDRIN; FORMATION; METABOLISM; MICROORGANISMS; SOILS; WATER

Photodieldrin was formed when microorganisms from soil, Lake Michigan water, rat intestine, or cow rumen were incubated with dieldrin.

702
Contamination of Soils and Food with Dimethanonaphthalene Derivatives

Matsushima, S.; Div. Health Control, Saku Hosp., Japan

Rinsho Eiyo(RNEYAW), 39(1), 1925; 1971

REVIEW; DIMETHANONAPHTHALENE; SOILS; FOOD; ALDRIN; ENDRIN

The contents of dimethanonaphthalene derivatives such as aldrin and endrin in soils and food are shown, and the effects of these contaminants on humans are reviewed.

703
Hazards to Livestock Caused by Inadequate Waste Dumping

Matthes, D.; Matthey, G.

Monatsh Vet. Med., 27, 875-6; 1972, November

LIVESTOCK; WASTES; DUMPING; ANIMALS;

704
Uptake and Soil Residual Nature of Two Pyridazinone Compounds in Conjunction with Other Herbicides for Nutsedge (CYPERUS ESCULENTUS) Control

McAvoy, W.J.; Rutgers State Univ., New Brunswick, NJ

Dissertation, Rutgers State University, New Brunswick, NJ, 95p.; 1973

HERBICIDES; PYRIDAZINONE; NUTSEDGE; SOILS; RESIDUES; UPTAKE

705
Adsorption and Desorption of Picloram Trifluralin and Paraquat by Ionic and Nonionic Exchange Resins

McCall, H.G.; Bovey, R.W.; McCully, M.G.; Merkle, M.G.

Weed Sci, 20(3), 250-255; 1972

HERBICIDES; ADSORPTION; DESORPTION; PICLORAM; TRIFLURALIN; PARAQUAT; RESINS

706
The Movement of Pesticides in Soils

McCarty, P.L.; King, P.H.

Purdue Univ., Eng. Bull., Ext. Ser. No., 156-71; 1966

MOVEMENT; PESTICIDES; SOILS

707
Residues of Chlorinated Hydrocarbons in Soybean Seed and Surface Soils from Selected Counties of South Carolina

McCaskill, W.R.; Phillips, B.H.; Thomas, C.A.; Clemson Univ., S.C.

Pestic. Monit. J., 4, 42-46; 1970

RESIDUES; CHLORINATED HYDROCARBONS; SOYBEANS; SOILS; SEEDS

The residue levels of chlorinated hydrocarbons in the soil varied from 0.000-3.582 microgram/gram, and in soybeans from 0.007-0.156 microgram/gram. There was no significant correlation between amounts of chlorinated hydrocarbons in soybeans and residues in soil. The concentration in both soybeans and soils (0-6 inch depth) varied with the soil region.

708
Degradation of Phenyl Carbamates in Soil by Mixed Suspension of Iso Propyl-N-Phenyl Carbamate Adapted Microorganisms

McClure, G.W.

J Environ Qual, 1(2), 177-180; 1972

ISOPROPYL-N-3-CHLOROPHENYL CARBAMATES; HERBICIDES; RESIDUES; SOILS; CARBAMATES; DEGRADATION; MICROORGANISMS

709
Accelerated Degradation of Herbicides in Soil by the Application of Microbial Nutrient Broths

McClure, G.W.; Boyce Thompson Inst. Pl. Res. Inc., Yonkers, NY

Contr. Boyce Thompson Inst. Pl. Res., 24, 235-240; 1970

DIPHENAMID; MONURON; ATRAZINE; DICAMBA; CIPC; AMIBEN; LOAM; FOLIAGE; DIURON; DEGRADATION; HERBICIDES; SOILS; MICROBIAL NUTRIENT BROTHS

In glass house experiments, diphenamid, monuron, atrazine, dicamba, CIPC, and amiben were applied to areas of loam at rates equal to the lower level of the recommended ranges. After application, water, Czapek Dox broth or Difco broth were sprayed on. Planting of mixed species followed 7 days after treatment, or 21 days later with 2 additional broth treatments. Three weeks after planting foliage was harvested. In a similar experiment diuron was also compared. Broth treatments accelerated the normal rate of herbicide degradation in most cases.

710
Effect of Soil Porosity Moisture and Temperature on Diffusion of 1,3-Dichloropropene Nematocides

McKenry, M.V.; Thomason, I.J.

Phytopathology, 61(8), 903; 1971

GAS CHROMATOGRAPHY; SOILS; POROUS; DIFFUSION; DICHLOROPROPENE

711
A Generalized Concept Concerning the Distribution of Fumigant Type Pesticides in Soils

McKenry, M.V.; Thomason, I.J.

J. Nematol., 4(4), 230; 1972

ETHYLENE; DIBROMIDE; DICHLOROPROPENE; DICHLOROPROPANE; VAPOR; FUMIGANTS; PESTICIDES; SOILS

712
Organochlorine Pesticide Residues in Woodcock, Soils, and Earthworms in Louisiana, 1965

Mclane, M.A.; Stickel, L.F.; Newson, J.D.; Patuxent Wildl. Res. Cent., Fish Wildl. Serv., Laurel, Md.

Pestic. Monit. J.(PEMJAA), 5(3), 248-50; 1971

BIRDS; SOILS; ORGANOCHLORINE INSECTICIDES; DDE; HEPTACHLOR; WOODCOCK; EARTHWORMS

Three years after the discontinuance of heptachlor treatments on some Louisiana fields, woodcock (PHILOHELA MINOR) sampled from the area contained 0.42 ppm heptachlor epoxide (dry wt.) and 3.62 ppm dde. The heptachlor epoxide values were lower and the DDE values were higher than those found 3-4 years earlier. Earthworms and soils contained traces of several organochlorine insecticides.

713
Effect of Isomerism on the Rate of Phenol Transformation in Chernozem Soil

Medvedev, V.A.; Davydov, V.D.; Donetsk. Ovoshche-Bakhchevaya Opytn. Stants., Vses. Akad. S.-Kh. Nauk Im. Lenina, Donetsk, USSR

Pochvovedenie (PVDEAZ) 5, 122-7; 1973

PHENOL; CHERNOZEM; SOILS; HYDROXYL GROUP; DEGRADATION; ISOMERS

714
Herbicide Activity in Relation to Soil Type

Meggitt, W.F.; Dep. Crop Soil Sci., Michigan State Univ., East Lansing, Mich.

Part of Pestic. Soil: Ecol., Degradation Movement, Int. Symp.(24AAaq) 1971 (139-4); 1971

PYRAZON; HERBICIDES; SOILS; SUGAR BEETS; CLAY; SOIL COMPOSITION

The herbicidal activity of pyrazon in sugar beet increased with the clay content of the soil. Soil texture and 2.5-5% organic material content had little effect on the herbicidal efficiency.

715
Decomposition. Qualitative Relations

Meikle, R.W.; Ag-Org. Dep., Dow Chem. Co., Walnut Creek, Calif.

Part of Org. Chem. Soil Environ.(26DJAE), 1, 145-251; 1972

REVIEW; PESTICIDES; TRANSFORMATION; MICROORGANISMS; SOILS

A review with 448 references. The qualitative aspects of the transformations of pesticides by microorganisms and by chemical means in the soil environment are discussed.

716
Metabolism of 4-dimethylamino-3,5-xylyl methylcarbamate (Mexacarbate, Active Ingredient of Zectran Insecticide): A Unified Picture

Meikle, R.W.; Dow Chemical Co., Ag-Organics Research Labs., 2800 Mitchell Dr., Walnut Creek, CA 94597

Bulletin of Environmental Contamination and Toxicology, 10(1), 29-36; 1973, July

CARBAMATE; INSECTICIDES; METABOLISM; MEXACARBATE; ZECTRAN; PLANTS; ANIMALS; INSECTS; SOILS; ENZYME SYSTEMS; OXIDATIVE N-DEMETHYLATION; DEAMINATION; HYDROLYSIS; CONJUGATION; CELL WALL; WASTE DISPOSAL

A unified picture is shown of the flow of reactions by which the insecticide, mexacarbate, is converted to other compounds in the biological systems of plants, animals, insects, and soils or as a result of in vitro use of enzyme systems. A variety of reactions are postulated to take place based on the identity of mexacarbate metabolites which have been characterized: oxidative N-demethylation, deamination, hydrolysis, and conjugation. The relatively modest amount of information available concerning the metabolism of mexacarbate in several biological systems, along with a knowledge of permissable enzymatic reactions, allows the construction of a unifed reaction scheme which is consistent with the facts. The scheme explains the gradual flow of metabolites into a pool of water-soluble compounds and ultimately, in the case of plants, into the polymeric ergastic substances of the cell wall and the materials extraneous to the cell wall. This process serves as a waste disposal system and allows the organism to maintain its state of health in the face of potentially toxic substances.

717
Measurement and Prediction of Picloram Disappearance Rates from Soil

Meikle, R.W.; Youngson, C.R.; Hedlund, R.T.; Goring, C.A.; Hamaker, J.W.; Addington, W.W.

Weed Sci., 21(6), 549-555; 1973

HERBICIDES; BIOLOGICAL DECOMPOSITION; ARRHENIUS EQUATION; TEMPERATURE; MOISTURE; PICLORAM; DISAPPEARANCE; SOILS

718
Pesticides and Environment Protection

Mel'Nikov, N.N.; Ussr

Zh. Vses. Khim. Obshchest.(ZVKOA6), 18(5), 570-6; 1973

REVIEW; PESTICIDES; RESIDUES; SOILS; FOOD; WATER; BIRDS

719
On the Selection of Promising Pesticides

Mel'Nikov, N.N.

Khim. Sel. Khoz., 10(4), 268-274; 1972

PESTICIDES; TOXICITY; PERSISTENCE; WARM-BLOODED; ANIMALS; FISH; PLANKTONS; METABOLISM; RAT; ORGANOCHLORINE; ARSENIC; DDT; PERSISTENCE; CHLOROAMINOTRIAZINES; PICLORAM; UREA; BENZOIC ACID; CARBAMATES; SALTS; DITHIOCARBAMIC ACIDS; ESTERS; CARBARYL; ALDICARB; PHTHALOPHOS; PHOSMET; BUTYPHOS; DEF; MOLINATE; TRIALLATE; EPTAM; EPTC; POLYCARBAZINE; HYDROXYLAMINE DERIVATIVES; NITROFEN; BENOMYL; ARYLOXACETIC ACID; DICAMBA; USAGE

A great variety of pesticides are listed and characterized according to their toxicity, persistence, and use. Moderate toxicity to warm-blooded animals, fish, and planktons, and rapid metabolism into more or less harmless products in the organism and the soil are sought in pesticides. The LD50 doses in rat and lethal concentrations in fish are listed for several pesticides. The variations in the toxicity of the same product to warm-blooded animals and fish are due to differences in the mode of action. Most organochlorine and arsenic compounds persist more than 18 months in the soil. DDT is destroyed relatively rapidly by certain microorganisms under anaerobic conditions. The persistence of chloroaminotriazines, picloram, and urea derivatives is about 18 months while that of benzoic acid derivatives and carbamates is 12 months. Pesticides of different classes should be used alternately to prevent accumulation in the ecosystem. Organophosphorus pesticides metabolize into relatively harmless products in warm-blooded animals although their esters and amides do not. A high rate of metabolism of carbamates, especially of esters and salts of thio- and dithiocarbamic acids, was determined. Many urea derived compounds, except for monuron and diuron, decompose during the growing period. Carbaryl, aldicarb, phthalophos (phosmet) butyphos (DEF), molinate, trialate, eptam (EPTC), polycarbazine, hydroxylamine derivatives, nitrofen, benomyl, aryloxyacetic acid and 2-methoxy-3, 6-dichlorobenzoic acid (Dicamba) derived compounds are among the most promising pesticides from the viewpoint of toxicity and persistence. (40 references)

720
The Determination of Mercury in Soils by Flameless Atomic Absorption

Melton, J.R.; Hoover, W.L.; Howard, P.A.

Soil Sci Soc Am Proc, 35(5), 850-852; 1971

VAPOR AERATION SYSTEM; MERCURY; SOILS; ATOMIC ABSORPTION

721
Movement and Persistence of Bensulfide and Trifluralin in Irrigated Soil

Menges, R.M.; Tamaz, S.

Weed Sci, 22(1), 67-71; 1974

SORGHUM-BICOLOR; HERBICIDES; GAS LIQUID CHROMATOGRAPHY; INCORPORATION DEPTH; PERSISTENCE; TRIFLURALIN; BENSULFIDE; SOILS; MOVEMENT; IRRIGATION MILLET; RAINFALL

Bensulfide and trifuluralin remained within the original zones of incorporation in soils regardless of rainfall. Trifluralin persisted longer as the depth of incorporation was increased. Neither compound persisted to any extent 12 months after application, although both were present in sufficient concentrations after six months to cause severe injury to sorghum or italian millet seedlings.

722
Degradation of Disulfoton and Phorate in Soil Influenced by Environmental Factors and Soil Type

Menzer, R.E.; Fontanilla, E.I.; Ditman, L.P.; University of Munford, College Park, MC

Bull. Env. Contam. Toxicol., 5, 1-5; 1970

DECOMPOSITION; INSECTICIDES; TEMPERATURE; DEGRADATION; DISULFOTON; PHORATE; SOILS

Rate of decomposition appeared to be influenced more by soil type than by temperature. Both insecticides were more rapidly degraded in winter than in summer. Rates of degradation were not closely related to temperature differences during sampling periods from October to April.

723
Fate of Pesticides in the Environment

Menzie, C.M.; Bur. Sport Fish. Wildl., U. S. Dep. Inter., Washington, D. C.

Annu. Rev. Entomol. (ARENAA), 17, 199-222; 1972

REVIEW; PESTICIDES; FATE; DEGRADATION

A review on the degradation of pesticides in the environment. (148 references)

724
Contamination of Soil and Fruit with Copper Containing Pesticides

Merenyuk, G.V.; Medzhibovskaya, Z.E.; Moldavian Res. Inst. Hyg., USSR

Gig Sanit, 35(1), 108-110; 1970

APPLES; MICROFLORA; VINEYARDS; SOILS; FRUITS; COPPER; PESTICIDES; CUPROSAN; BORDEAUX; COPPER SULFATE; ORCHARDS; RESIDUES

Application of cuprosan (0.6%) or bordeaux mixture (1%) sprays to an apple orchard increased soil Cu from 7-8 mg/kg to 18 and 14 mg/kg, respectively, in the 0-30 cm layer. Spraying with bordeaux mixture (1%) in vineyards over a period of 5 years resulted in up to 50 mg/kg Cu residues in the soil, the residues usually remaining in the 0.20 cm layer and penetrating deeper at a very slow rate. Cu residues in sandy loams, from cuprosan (0.6%) sprays, occurred to a depth of 1 m within 3 months after the first treatment; residues resulting from pesticides that contain 3 mg/kg Cu or more may, in these soils, depress microbial activity and organic-matter mineralization. Application of $CuSO_4$ in the irrigation water decreased the microflora and nitrification in soil and tended to increase pH.

725
Biological and Non-Biological Dissipation of Trifluralin from Soil

Messersmith, C.G.; Burnside, O.C.; Lavy, T.L.; University of Nebraska, Lincoln, Nebraska

Weed Sci, 19(3), 285-290; 1971

HERBICIDES; PHYTOTOXICITY; TEMPERATURE; DISSIPATION; SOILS; TRIFLURALIN; BREAKDOWN; CLAY; SAND; LOAM

Phytotoxicity of trifluralin incubated for 10 months remained at 6.4, 0 and 1.6 ppmw of the original 8 ppmw in a silty clay loam and at 3.0, 3.2 and 0.6 ppmw of the original 4 ppmw in a sandy loam at 15, 25 and 35 degrees C, respectively. Breakdown of C-14 trifluralin to $^{14}CO_2$ in both soils was more rapid at 1.6 than at 0.8 field capacity and at 1 than 100 ppmw of trifluralin. Breakdown to $^{14}CO_2$ accounted for 5 and 3% of the decrease of carbon-14 activity in the silty clay loam and sandy loam, respectively.

726
Model Ecosystem for the Evaluation of Pesticide Biodegradability and Ecological Magnification

Metcalf, R.L.; Sch. Life Sci., Univ. Illinois, Urbana, Ill.

Outlook Agr. (OUAGA8), 7(2), 55-9; 1972

REVIEW; MODEL ECOSYSTEM; INSECTICIDES; DDT; BIODEGRADATION; BIOMAGNIFICATION

727
Development of Persistent Biodegradable Insecticides Related to DDT

Metcalf, R.L.; Kapoor, I.P.; Hirwe, A.S.; Dep. Zool., Univ. Illinois, Urbana, Ill.

Part of Degradation Syn. Org. Mol. Biosphere, Proc. Conf. (26PWat) 1972, (244-59); 1972

REVIEW; BIODEGRADABILITY; DDT; ANALOGS; INSECTICIDES; ANALOGS; MODEL ECOSYSTEM

A review on the chemistry and insecticidal activity of biodegradable DDT analogs, and on their behavior in a model ecosystem. (23 references)

728
Environmental Distribution and Metabolic Fate of Key Industrial Pollutants and Pesticides in a Model Ecosystem

Metcalf, R.L.; Lu, Po-Yung; Kapoor, I.P.; Illinois Univ., Urbana, Water Resources Center

Research Report, Water Resources Center, Urbana, Ill.; Report No. WRC-RR-69; Contract DI-14-31-0001-3273; Monitoring Agency Rept. No. W74-01655, OWRR-B-050-ILL(1); Proj. OWRR-B-050-ILL; 102 p.; 1973, June

ECOSYSTEMS; BIPHENYLS; INDUSTRIAL EFFLUENTS; BIODETERIORATION; PESTICIDES; WATER; INDUSTRIAL WASTES; FOOD CHAINS; CARBAMATES; ORGANIC PHOSPHATES; MODELS; SOLUBILITY; ISOTOPIC LABELLING; PLASTICIZERS; CHLORINE; PHTHALATES; ACCUMULATION; MODEL ECOSYSTEM; DEGRADATION; BIODEGRADATION; BIOMAGNIFICATION

The contamination of water supplies with toxic substances liberated into the environment either accidentally as industrial or household wastes or purposefully as pesticides and food additives is an important problem in environmental quality. Radiolabeled contaminants used in a laboratory model ecosystem provide an elegant method for determining the degradative fate of potential pollutants, indications of their toxic effects to a variety of food chain organisms, and measurement of their ecological magnification in food chain organisms. The results have been expressed in terms of ecological magnification and biodegradability index, and have been examined for correlation with such physio-chemical properties as water solubility, and partion coefficient, and for relationships to electron distribution.

729
Model Ecosystem for the Evaluation of Pesticide Biodegradability and Ecological Magnification

Metcalf, R.L.; Sangha, G.K.; Kapoor, I.P.

Environ Sci TEchnol, 5(8), 709-713; 1971

MODEL ECOSYSTEM; PESTICIDES; DEGRADATION; MODEL; BIODEGRADATION; BIOMAGNIFICATION

730
Adsorption of Insecticides on Pond Sediments and Watershed Soils

Meyers, N.L.; Ahlrichs, J.L.; White, J.L.

Proc. Indiana Acad Sci., 79, 432-437; 1970

MALATHION; PHORATE; CARBARYL; CLAY; MINERALS; SEDIMENTS; PONDS; WATERSHED; SOILS; ADSORPTION; INSECTICIDES

731
Interaction Between Soil Microflora and Herbicide Agelon

Micev, N.; Bubalov, M.; Fac. Agric. For., State Univ., Skopje, Yugoslavia

Symp. Biol. Hung.(SYBHAK), 11, 379-84; 1972

AGELON; SOILS; MICROFLORA; SUGAR; HERBICIDES; FUNGUS; ACTINOMYCETES; ARTHROBACTER; ATRAZINE; PROMETRYNE; MICROFLORA; HUMUS; TOLERANCE

Agelon (3 kg/ha) stimulated soil fungal growth but decreased the growth of actinomycetes. In the presence of additional sugar (2 and 5%), arthrobacter was tolerant to atrazine and prometryne. Additional organic material in the soil possibly affords a higher tolerance to herbicides by soil microflora.

732
Relation Between Herbicide Dymid and Soil Microorganisms

Mickovski, M.; Fac. Agric. For., State Univ., Skopje, Yugoslavia

Symp. Biol. Hung.(SYBHAK), 11, 397-400; 1972

HERBICIDES; SOILS; MICROFLORA; DYMAID; AZOTOBACTER; MICROORGANISMS

733
Organic Mercurials as an Environmental Problem

Miettinen, J.K.

Part of Spencer, D.A. (Chairman). Nuclear Techniques for Studying Pesticide Residue Problems. Symposium. Unipub, Inc.: New York, NY, (p. 43-47), 84 p.; 1970

BACTERIA; SLUDGE; WATER; NUCLEAR TECHNIQUES; AGRICULTURE; PESTICIDES; RESIDUES; INDUSTRY; MERCURY

734
Degradation of Heptachlor Epoxide and Heptachlor by a Mixed Culture of Soil Microorganisms

Miles, J.R.; Tu, C.M.; Harris, C.R.; Res. Inst., Canada Dep. Agric., London, Ont.

J. Econ. Entomol.(JEENAI), 64(4), 839-41; 1971

HEPTACHLOR; SOILS; MICROBES; INSECTICIDES; DEGRADATION; MICROORGANISMS

A mixed culture of soil microorganisms, obtained from a sandy loam soil, degraded heptachlor epoxide to the less toxic 1-exohydroxychlordene. Conversion was greater than 1%/week during the 12-week test periods. The same mixed culture reduced heptachlor to chlordene but was inactive when incubated with 1-exohydroxychlordene or 1-exohydroxy-2,3-epoxychlordene. This degradation of heptachlor epoxide may explain the occurrence of high levels of 1-exohydroxychlordene and low levels of heptachlor epoxide found in heptachlor-treated soils.

735
Pollution by Organic Substances

Milhaud, G.; Pinault, L.; Ecole Nat. Vet., Lab. de Pharmacie et Toxicol., Alfort, France

Gaz. Med. Fr., 79(40), 7637-7644; 1972

PESTICIDES; DDT; LINDANE; HEPTACHLOR; DEGRADATION; FISH; AQUATIC ORGANISMS; ENDOSULFAN; MERCURY; FOOD; SOILS; WATER; ORGANIC PESTICIDES; REVIEW; PERSISTENCE; PLANTS; HUMANS; ANIMALS; INDUSTRIAL EFFLUENTS; AIR; FISH; INSECTICIDES

General problems and hazards of soil and water pollution and of the contamination of foods by organic substances, including pesticides, are surveyed. Organochlorine pesticides, such as DDT, lindane, and heptachlor, are highly persistent in the soil. The time necessary for 95% degradation of heptachlor, lindane, and DDT in the soil was 3-5 yr, 3-10 yr, and 4-30 yr, depending on the soil type. Fish and other aquatic organisms are highly sensitive to pesticides in the water, which is demonstrated by instances of massive fish deaths due to DDT in Canada and to endosulfan in the Rhine, as well as by the very high DDT and mercury concentrations in clams, oysters, and fish, especially tuna. The acceptable daily intake of pesticide residues in foods should be determined with respect to the consumption of contaminated food for a very long period of time.

736
Persistence and Movement of Parathion in Irrigation Waters

Miller, C.W.

Pest. Monit. J., 1(2), 47-48; 1967

PERSISTENCE; MOVEMENT; PARATHION; IRRIGATION WATERS

737
Sorption from Aqueous Solution by Organo-Clays: II. Thermodynamics of 2,4-D Sorption by Various Organo-Clays

Miller, R.W.; Faust, S.D.; Dept. Soil Sci. Biometeorol, Utah State Univ., Logan, UT 84321

Environ. Lett., 2(4), 183-194; 1972

2,4-D; SORPTION; CLAY; ORGANOCLAYS; BENTONITE; CATION EXCHANGE; TMBODA; DODECYLAMINE; DIMETHYLBENZYL OCTADECYL-AMMONIUM CHLORIDE; DIOCTADECYL-AMMONIUM CHLORIDE

738
Sorption from Aqueous Solution by Organo-Clay: III. The Effect of pH on Sorption of Various Phenols

Miller, R.W.; Faust, S.D.; Dept. Soil Sci. Biometeorol., Utah State Univ., Logan, UT 84321

Environ. Lett., 4(3), 211-223; 1973

SORPTION; 2,4-D; PH; PROTOLYSIS; PHENOL; ORGANOCLAY; PHENOXYACETIC ACIDS; CLAYS; BENTONITE

Sorption of 2,4 D and various phenolic compounds by Bentone 24 (Wyoming bentonite coated with one symmetry of dimethylbenzyl octadecylammonium chloride) is pH dependent where the organic compound will vary in the extent of protolysis. Also this dependence is effective beyond the pH limits affecting protolysis for some compounds. Maximum sorption appears to occur generally where protolysis is less than 50%. The few observations reported here make this estimate a working guide for further study. Studies using organic clay coating of different composition (polarity or electron densities) may have a sorption pH relationship quite different. The percentage sorted is different for the clay with the organic coating of amine having both aromatic plus alkyl portions (Bentone 24) than with an alkylamine coating (Bentone 18 C). The relative sorption of various phenols is much the same on both organoclays. (13 refs)

739
Interactions Between Biotic Components in Soils and their Modification by Management Practices in Canada. Review

Mills, J.T.; Alley, B.P.; Res. Stn., Agric. Canada, Winnipeg, Manitoba

Can. J. Plant Sci.(CPLSAY), 53(3), 425-41; 1973

REVIEW; PESTICIDES; SOILS; MICROFLORA; MICROORGANISMS

740
Persistence of Dimethoate in Soils

Mishra, R.C.; Gupta, D.S.; Entomol. Sect., H.P. Agric. Coll., Solan, India

Pesticides(PSTDAN), 6(11), 28-30; 1972

DIMETHOATE; SOILS; PERSISTENCE; ORGANOPHOSPHORUS INSECTICIDES; INSECTICIDES

As shown in bioassay, using DROSOPHILA MELANOGASTER the half-life of 4 and 8 ppm dimethoate in 3 types of soil was 5-7 days in the 0-2-inch layer, and was 5-14 days in the 2-4 inch layer. More dimethoate leached out in the sandy soil than did in loam or clay loam soil.

741
Adsorption of Arsentites by Soils and Compost

Misra, S.G.; Benjamin, I.

Indian J. Appl. Chem., 25(2-3), 99-100; 1962

COMPOST; ADSORPTION; ARSENITE; ARSENIC; SOILS

Experiments were done to determine the amount of As retained when Na arsenite was added alone or with NaCl or K2SO4. A neutral soil absorbed more As than did an acid soil (pH 5.0) or a neutral compost.

742
Studies on Arsenite-Arsenate System. Adsorption of Arsenate

Misra, S.G.; Tiwari, R.C.; Agricultural Chemistry Station, University of Allahabad, Allahabad, (U.P.)

Soil Science and Plant Nutrition, 9, 10-13; 1963

ARSENITE; ARSENATE; SOILS; COMPOST; ANION EFFECT; CATION EFFECT; EXTRACTION; ARSENIC; ADSORPTION

In this investigation the retention of arsenate ions either singly or in the presence of arsenite by soils and compost has been studied. The interference caused by anions or cations on the retention of arsenate as well as the extraction of the absorbed arsenate by different extractants has also been investigated.

743
Arsenite-Arsenate Adsorption in Soils

Misra, S.G.; Tiwari, R.C.

Indian J. Appl. Chem., 26, 117-121; 1963

ARSENATE IONS; RED SOIL; COMPOST; SESQUIOXIDES; PH; ARSENITE; ADSORPTION; ARSENITE IONS; CALCIUM; SOILS

More arsenate ions are adsorbed by a latoritic soil than by a red soil or compost, due to the amount of Fe2O(3) or sesquioxides, Ca or some other ion and reducing pH in the soil. Arsenite adsorption is affected by the presence of AsO4(3-) ions; it decreases in soil but increases in compost. Arsenite ions are converted into arsenate ions by Fe2O(3) or alkalinity.

744
Studies on Arsenite-Arsenate Systems. Adsorption of Arsenate

Misra, S.G.; Tiwari, R.C.

Soil Sci. & Plant Nutr., 9, 216-219; 1962

ADSORPTION; ARSENATE; ARSENITE; SOILS; ARSENIC

745
Residual Dexon and the Persistent Effect of Soil Treatments of Control of Pea-D Root Rot Caused by Aphanomyces-Euteiches

Mitchell, J.E.; Hagedorn, D.J.

Phytopathology, 61(8), 978-983; 1971

FUNGICIDES; RESIDUES; DEXON; PEAS; ROOTS; ROT; SOILS; PERSISTENCE

746
Organophosphorus Insecticides and Environment

Miyamoto, J.

Botyu-Kagaku, 36(4), 189-221; 1971

DECOMPOSITION; ORGANOPHOSPHORUS INSECTICIDES; INSECTICIDES

747
Kinetics of the Microbial Decomposition of the Herbicides IPC, and CIPC

Moe, F.G.; Makerere Univ. Coll., Kampala, Uganda

Environ. Sci. Technol., 4, 429-431; 1970

HYDROLYSIS; IPC; CIPC; DECOMPOSITION; MICROORGANISMS; CARBAMATE; CARBANILIC ACID; HERBICIDES; ACTIVATION ENERGY

Incubation tests using the herbicides as C sources of PSEUDOMONAS STRIATA were conducted at 20 degrees and 30 degrees C. Activation energy required for the hydrolysis of IPC was about 4 kcal/mole, and that for the hydrolysis of CIPC was 2 kcal.

748
Parathion: Toxicity to Sheep and Persistence on Pasture and in Soil.

Mol, J.C.M.; Harrison, D.L.; Telfer, R.H.; Wallaceville, Animal Research Centre, Department of Agriculture, Private Bag, Upper Hutt, New Zealand.

New Zealand Journal of Agricultural Research, 15(2), 306-320; 1972

PASTURES; PARATHION; PENETRATION; PERSISTENCE; RESIDUES; SOILS; GRASS; PLANTS; SHEEP; INSECTICIDES

Pastures were topdressed with granules of 20% Parathion at 3.4 and 6.7 kg a.i./ha. Over a 3-month period, parathion residues in the top 2.5cm of soil decreased correspondingly from 6.5ppm to 4.7ppm and from 10.7ppm to 8.5ppm. There was little penetration of parathion below the top 2.5cm of soil, and no parathion occurred in soil 8 months after treatment.

749
Micromovement of Propachlor from Granules in Soil

Molnau, M.P.; Lovely, W.G.; Johnson, H.P.; Dep. Agric. Eng., Univ. Idaho, Moscow, Idaho

Weed Sci.(WEESA6), 21(3), 185-8; 1973

PROPACHLOR; MOVEMENT; SOILS; HERBICIDES; SOIL MOISTURE; GRANULES

Movement of 2-chloro-n-isopropylacetanilide (propachlor) from a granule to the soil was classified as horizontal, below the granule, above the granule, and into an area within a 3-ppmw contour. The influence of depth of placement, moisture content, temperature, relative humidity, and exposure time on each of the movement classifications was determined. Horizontal movement increased as the temperature, moisture, and exposure time increased. Propachlor tneds to move down into the soil under dry conditions and up when the soil is moist. The size of the soil area that contained 3 ppmw was greater for granules placed in the soil than for granules placed on the surface. The size of the area increased as the moisture increased.

750
Application of Mathematical Analysis During Simulation of the Behavior of Sevin in Soil

Molozhanova, E.G.; Kanevskii, A.A.; Ussr

Gig. Primen., Toksikol. Pestits. Klin. Otravl.(D8MMYC), No. 9, 77-83; 1971

SEVIN; SOILS; DECOMPOSITION; CARBAMATES; INSECTICIDES; MODEL

A mathematical model is given for the decomposition of sevin in soil. For less than 15 days, the decomposition is characterized by the expression 10a + bt, where a = the log10 of the starting concentration, t the time and b ranges between -0.046 and 0.114, depending on the type of soil. At 15-45 days the curve is linear.

751
Residues of Selected Pesticides - Their Nature, Distribution, and Persistence in Plants, Animals and the Environment

Montgomery, M. L.

Oreg. State Univ. Enviorn. Health Sci. Cen., 233; 1972

PLANTS; 2,4,5-T; CHLORINE; DEGRADATION; DDT; METABOLITES; DDE; DDA; DBP; CARBON 14; GAS CHROMATOGRAPHY; SOILS

In an investigation of the ability of crop plants and brushy plants to metabolize 2,4,5-T, all of the carbon 14 applied was recovered as 2,4,5-T or a conjugate of 2,4,5-T. Gas chromatographic analysis revealed only one chlorine-containing compound, 2,4,5-T. A second study, on the soil degradation of known DDT metabolites DDE, DDA, and DBP, indicated that the rate-limiting step in the loss of DDT from soil is the degradation of DDE. After six months, 90% of the DDE remained, while more than 50% of the DDA and DBP were degraded. DBP was detected as a metabolite of DDA.

752
Biological Degradation of Pesticide Wastes

Montgomery, M.L.; Klein, D.; Goulding, R.L.; Freed, V.H.; Oregon State Univ., Corvallis, OR

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAAT), 6, 117-25; 1972

PESTICIDES; WASTES; BIODEGRADATION; 2,4-D; 2,4-DICHLOROPHENOLS; SODIUM HYDROXIDE; DICHLOROPHENOL

Biological soil degradation has been studied as a possible means of detoxifying pesticide wastes. Site selection must meet these criteria: there must be a minimum risk of contaminated water leaving the testing area; microorganisms capable of degrading the waste material to be detoxified must be in the soil; the land used must be of low economic value. The waste concentrate used for this study resulted from the manufacture of 2,4-D and thus contained unreacted 2,4-dichlorophenol, unrecovered 2,4-D, and a considerable amount of sodium hydroxide. The waste material was diluted and spread at the rate of 300 pounds per acre of 2,4-D and 900 pounds per acre of dichlorophenol. Significant reductions of the chemicals occurred during the first few months; these were greatest in the surface two inches of soil. About 80% of the applied chemical was gone the first year. Microorganism counts shrank initially but returned to normal levels in about 4-6 months. Proper management, consisting of maintenance of moisture and temperature, accelerated the rate of degradation.

753
A Preliminary Study of the Dangers Involved in the Use of 2,4,5-T in Forest

Montgomery, M.L.; Norris, L.A.

Bodenkultur, 21(4), 425-431; 1970

2,4,5-T; WATER; FISH; ANIMALS; ABSORPTION; DEGRADATION; SOILS; RAINFALL; VEGETATION; PLANTS; HERBICIDES

The use of 2,4,5-Trichlorophenoxyacetic acid (2,4,5-T) causes a slight temporary water pollution. There is no significant danger to fish or other animals. The extensive absorption and degradation of 2,4,5-T in forest soils hinders its later displacement from treated areas to open water and subsoil water. Dilution by growth and degradation reduce the residue of the herbicide in the vegetation within several weeks. 2,4,5-T has a low toxicity; it is not permanent in the soil or in plants and is quickly eliminated by animals.

754
Kinetics of Dichlobenil Degradation in Soil

Montgomery, M.L.; Yu, T.C.; Freed, V.H.; Oregon State University, Corvallis, OR

Weed Res, 12(1), 31-36; 1972

HERBICIDES; TEMPERATURE; 2,6 DICHLOROBENZAMIDE; DICHLOBENIL; DEGRADATION; SOILS; ACTIVATION ENERGY; METABOLITES; HALF-LIFE; KINETICS

The degradation of dichlobenil in soil, determined at 6.7 and 26.7 degrees, C, followed first order kinetics but at 6.7 degrees C this occurred after an initial time lag of 10 weeks. The half-lives were 28 weeks (+ 10 weeks lag) at 6.7 degrees C and 19 weeks at 26.7 degrees C. The relatively low value of the activation energy (3.57 kcal mole) showed that the degradation of dichlobenil was not as markedly affected by temperature as that of many other herbicides. The only detectable metabolite was 2,6 dichlorobenzamide, a compound that should have a substantially lower vapour pressure and a higher affinity for surfaces than the parent compound.

755
Mercury in Soil and Plant Systems: A Review of Literature.

Noraghan, J.T.; N. Dak. St. Univ., Fargo, N.D.

Farm Res., 28(4), 53-55; 1971

MERCURY; SOILS; PLANTS; REVIEW

756
Soil Contamination.

Morishita, T.; Tokyo Educ. Univ., Tokyo, Japan

Kagaku Kogyo (Chem. Ind.), 23(10), 1322-1327; 1972

ARSENATE; COPPER SULFATE; ORCHARDS; TOPSOIL; ARSENIC; COPPER; METALS; APPLES; ABSORPTION; ROOTS; ORANGES; FRUITS; PLANTS; PESTICIDES

Large quantities of arsenate and copper sulfate pesticides are used in apple and orange orchards outside Yokohama. The topsoil of orchards has a considerable accumulation of arsenic and copper. For instance, 500 ppm of arsenic and more than 200 ppm of copper have been detected in the topsoil of a 50-year-old apple orchard in Aomori. These metals cause increased metal ion concentration in soil which in turn will increase the metal absorption by the roots of produce.

757
Soil-Pesticide Interactions

Morley, H.V.; Chemistry and Biology Research Institute, Research Branch, Canada Dept. of Agriculture, Ottawa, Ontario, K1A 0C6, Canada

Part of Westley, B. (Ed.), Proceedings of Environmental Pollutants. Held at Ottawa, Ontario, Canada, June 14-17, 1971 (p. 69-71), 449 p.

SOILS; SOIL-PESTICIDE INTERACTIONS; AVAILABILITY; PESTICIDES; LINDANE; POLYCHLORINATED BIPHENYLS; DIELDRIN; CARROTS; UPTAKE; ALDRIN; EXTRACTION; PERSISTENCE; TRANSPORT; HERBICIDES; COMPLEXES; PHYTOTOXICITY; DEGRADATION; METABOLIC TRANSFORMATIONS; PHOTODECOMPOSITION; HYDROLYSIS; DEALKYLATION; RESIDUES

Implications of soil-pesticide interactions are discussed with respect to both the residue chemist and the biologist. The concepts of "biological and chemical availability" of pesticide residues in soil are discussed. Recent work on the solubilization of hydrophobic materials by soil organic matter is presented and its implications in the mobilization of pesticide residues in soil considered. Transformation of pesticide residues in the soil is briefly discussed.

758
Persistence of Linuron Residues in Soils at Kelligrews, Newfoundland

Morris, R.P.; Penney, B.G.; John's West Res. Stn, Newfoundland, Canada

Can J Plant Sci, 51(3), 242-245; 1971

HERBICIDES; PERSISTENCE; OATS; CABBAGE; SEEDLINGS; LINURON; SOILS; RESIDUES; CROPS; PLANTS

Oats and cabbage seedlings in pot experiments with linuron-treated soil died within 30 and 7 days after germination, showing that, under Newfoundland soil and climatic conditions, linuron residues may cause substantial injury to linuron-sensitive crops planted in the year following application, even when recommended rates are applied.

759
Metabolism of Organophosphorus Insecticides. 14. Malathion Breakdown by Soil Fungi

Mostafa, I.Y.; Bahig, M.R.; Fakhr, I.M.; Adam, Y.; Dep. Radiobiol., At. Energy Auth., Cairo, UAR

Z. Naturforsch. B(ZENBAX), 27(9), 1115-6; 1972

MALATHION; SOILS; FUNGUS; METABOLISM; INSECTICIDES; ORGANOPHOSPHORUS INSECTICIDES

760
Behavior of the Arboricide Fenuron in Soil and Water in Conditions of the Leningrad Region

Motuzinskii, N.P.

Gig. Primen., Toksikol. Pestits. Klin. Otravl.(86-92ØD8MMYC), No. 9, 86-92) 1971, No. 9,() 86-92; 1971

FENURON; SOILS; WATER; HERBICIDES; PERSISTENCE; ARBORICIDES

761
Fenuron Residues in Various Media

Motuzinskii, N.P.; Sannikov, G.P.; Fedorova, I.N.; Vses. Nauchno-Issled. Inst. Gig. Toksikol. Pestits. Polim. Plast. Mass, USSR

Khim. Sel. Khoz.(KSKZAN) 1972, 10(9) 689-93; 1972

FENURON; ARBORICIDES; RESIDUES; PLANTS; WATER; SOILS; PESTICIDES; TREES

762
Adsorption and Desorption of Herbicides with Soil Colloids

Moyer, J.R.; Univ. Saskatchewan, Saskatoon, Sask.

Thesis University of Saskatchewan, Saskatoon, Saskatchewan, Canada; Univ. Microfilms, Ann Arbor, Mich., Order No. 72-23,474; 1972

HERBICIDES; ADSORPTION; SOIL COLLOIDS; MONURON; ATRAZINE; AMIBEN; DIURON; DESORPTION

763
The Effect of Adsorbents on the Rate of Degradation of Herbicides Incubated with Soil

Moyer, J.R.; Hance, R.J.; McKone, C.E.

Soil Biol Biochem, 4(3): 307-311; 1972

ADSORPTION; SOILS; DEGRADATION; HERBICIDES

764
Desorption of some Herbicides from Montmorillonite and Peat

Moyer, J.R.; McKercher, R.B.; Hance, R.J.; Saskatchewan Inst. Pedol., Univ. Saskatchewan, Saskatoon, Saskatchewan, Canada

Can. J. Soil Sci.(CJSSAR), 52(3), 439-47; 1972

HERBICIDES; SOILS; ADSORPTION; MONURON; ATRAZINE; PROMETRYNE; DESORPTION; MONTMORILLONITE; PEAT; SORPTION; LINURON; DEGRADATION; ISOTHERMS; HUMIDITY; RELATIVE HUMIDITY

Irreversible adsorption to the organic matter in soil might be a mechanism for herbicide inactivation. The desorption of monuron, atrazine, and prometryne from montmorillonite was tested after a 24-hour adsorption period, and following drying. Monuron and atrazine were reversibly adsorbed in both cases. Immediately after desorption, less prometryne was desorbed than predicted by the isotherm, but after drying, more was desorbed than predicted. With peat, monuron and atrazine were reversibly adsorbed, if desorption was carried out immediately after adsorption, but, after drying to constant weight at 65 degrees relative humidity, the desorption was not completely reversible. Sorption of prometryne and linuron by the peat was not completely reversible whether desorption was attempted immediately after adsorption, or after drying. Desorption was reduced by the drying step with linuron, but not with prometryne. Degradation of the herbicides could not account for the irreversibility.

765
Influence of Adsorption on the Uptake of Diuron by Barley Plants

Moyer, J.R.; McKercher, R.B.; Hance, R.J.; Soil Sci. Dep., Univ. Saskatchewan, Saskatoon, Sask.

Can. J. Plant Sci.(OPLSAY), 52(5), 668-70; 1972

ADSORPTION; DIURON; BARLEY; HERBICIDES; UPTAKE; WATER; TRANSPIRATION

The amounts of uptake of diuron by barley plants from nutrient solution, or from mesic peat or oxbow loam soil containing different quantities of absorbed herbicide but the same solution concentration were similar. Diuron uptake sems to be controlled by the solution concentration and the volume of water transpired.

766
Leaching of Water Soluble Carbon-14-Labeled Decomposition Products of Aldrin from Soils

Moza, P.; Weisgerber, I.; Klein, W.; Inst. Oekol. Chem., Ges. Strahlen- und Umweltforsch. M.B.H., Munich, Germany

Chemosphere(CMSHAF), 1(5), 191-5; 1972

ALDRIN; SOILS; CHLORINATED INSECTICIDES; LOESS; TRANSFORMATION; DECOMPOSITION; METABOLISM; CARBOXYLIC ACID; LEACHING; RAINFALL; TRACER; WATER; INSECTICIDES

14C-labelled aldrin, applied in the top 10 cm of loess soil in pots at 2.9 kg/ha, was gradually transformed to the more hydrophilic 1,3-dihydrochlordenedicarboxylic acid, which was leached out by rainfall.

767
Contributions to Ecologic Chemistry. 1. Washing Out of a Watersoluble Aldrin 14C Degradation Product from Soil

Moza, P.; Weisgerber, I.; Klein, W.; Inst. Okol. Chem. Schloss Birlinghoven, Gesellsch. Strahlen Umweltforsch. mbH, Munchen

Chemosphere, 1(5), 191-195; 1972

ALDRIN; PLANTS; DRAINAGE WATER; DICARBOXYLIC ACIDS; DEGRADATION; DEGRADATION PRODUCTS; SOILS; WASHOUT

Experimental work on soil treated with C14 aldrin showed that unbridged dihydrochlordiene dicarboxylic acids were present in the soil, plants growing in the soil and in drainage water, following application of the pesticide. Studies to determine whether these dicarboxylic acids are the end product of aldrin degradation in soil are continuing. Unidentified hydrophilic radioactive substances were extracted from the soil after the application of aldrin, but they were also present in traces in drainage water.

768
Dynamics of the Herbicide Hungazin in Soil

Mozheiko, A.M.; Litvinov, I.A.

Tr. Khar'Kov. Sel'Skokhoz. Inst.(TKKSAB), 92, 48-52; 1969

HUNGAZIN; DYNAMICS; SOILS; HERBICIDES

During the first year after application of hungazin (4-10 kg/ha) to soil, nearly all of the herbicide was found in the top 20 cm of the soil. Its concentration in the top 10 cm decreased at midsummer, but increased at the end of the summer. During the second year it was found in soil 10-30 cm below the surface. It was not appreciably degraded by the soil.

769
Agricultural Chemicals as Pollutants

Mrak, E.M.

Part of White, Philip L. and Nancy Selvey (Ed.). Western Hemisphere Nutrition Congress 3. Symposium. Miami Beach Florida, Aug. 30-Sept. 2, 1971. Futura Publishing Co., Inc: Mount Kisco, NY, (p. 284-288), 389 p.; 1972

HUMANS; PESTICIDES; AIR; WATER; SOILS; PLANTS; FOOD; AGRICULTURE

770
Changes in the Beetle Fauna of the Upper Surface of the Soil of Cultivated Fields After Application of Herbicides Coleoptera

Mueller, G.

Folia Entomol Hung, 25(8-35), 197-305; 1972

CARROTS; CELERY; POTATOES; ELBANIL; SIMAZINE; PROMETRYNE; ISOPROPYL-N-3-CHLOROPHENYL CARBAMATES; INSECTICIDES; BEETLE FAUNA; HERBICIDES

771
Persistence of Organochlorine Insecticide Residues in Agricultural Soils of Colorado

Mullins, D.E.; Johnsen, R.E.; Starr, R.I.; Dep. Entomol., Colorado State Univ., Fort Collins, Colo.

Pestic. Monit. J.(PEMJAA), 5(3), 268-75; 1971

ORGANOCHLORINE INSECTICIDES; SOILS; INSECTICIDES; DDT; ALDRIN; DIELDRIN; HEPTACHLOR; HEPTACHLOR EPOXIDE; CHLORDANE; LINDANE; DICOFOL; ENDRIN; ENDOSULFAN; TETRADIFON; TOXAPHENE

The organochlorine insecticides residues in Colorado soils were lower than those in other regions. Of 50 soil samples, DDT (0.06-41.1 ppm) was detected in 27, aldrin and/or dieldrin (0.02-0.91 ppm) in 14, hpetachlor and/or its epoxide (0.02-0.07 ppm) in 11, and chlordane (0.02-0.05 ppm) in 8. Also detected were lindane in 8, dicofol in 7, endrin in 2, endosulfan in 1, tetradifon in 1, and toxaphene in 1 sample.

772
Ecological Effects of Herbicides

Mullison, W.R.

Down Earth, 29(2), 21-24; 1972

HERBICIDES; DEGRADATION; BREAKDOWN; SOILS; RESIDUES; PHYTOTOXICITY

773
Factors Affecting the Efficacy of Fungicides in Soil

Munnecke, D.E.; Dep. Plant Pathol., Univ. California, Riverside, Calif.

Annu. Rev. Phytopathol.(APPYAG), 10, 375-98; 1972

REVIEW; FUNGICIDES; SOILS

774
Arsenic Residues in Potato Soils and Tubers

Murphy, H.J.; Goven, M.J.

Maine Farm Res., 13(3), 4-8; 1966

ARSENIC; RESIDUES; POTATOES; SOILS; TUBERS

775
Chemical Seedbed Preparation and the Efficiency of Nitrogen Utilization by Sod-Grown Oats. 2. Spraying Interval and Comparison of Herbicides.

Murtagh, G.J.; Dept. of Agriculture, Agricultural Research Station, Wollongbar, N.S.W., Australia

Aust. J. Expl Agric. Anim. Husb., 11, 307-312; 1971

HERBICIDES; OATS; SOILS; NITROGEN UTILIZATION; CHEMICAL SEEDBED PREPARATION

Four herbicides were compared in the preparation of the seedbed for sod-grown oats using varying intervals between spraying and sowing on a red basaltic soil.

776
Adsorption and Desorption of Diuron as a Function of Soil Properties

Mustafa, M.A.; Gamar, Y.; Khartoum University, Sudan

Soil Sci Soc am Proc, 36(4), 561-565; 1972

HERBICIDES; ARID ZONE; SOILS; CATION EXCHANGE; STATISTICAL ANALYSIS; ADSORPTION; DESORPTION; DIURON

Statistical analysis of 12 soils of the arid zone, gave r(2) values for diuron absorbed in relation to cec, specific surface area and organic carbon percentage equal to 0.785, 0.754 and 0.476 respectively. Variability of diuron desorption was basically due to diuron initially adsorbed (r(2)=0.864). Desoprtion could also be predicted from the specific surfact area (r(2)=0.846) or from cec (r(2)=0.828) but not from organic carbon percentage (r(2)=0.372).

777
Pesticide Residues and Their Effects on Microbial Activities Following Massive Disposal of Pesticides in the Soil

Naidu, S.M.; Mississippi State Univ., State College, Ms

Dissertation, Mississippi State University, State College, MS, 153 p.; 1972

DISPOSAL; MICROBIAL EFFECT; DDT; SOILS; DIELDRIN; PESTICIDES; CARBARYL; MALATHION; RESIDUES

778
Fate of Pesticides in Soil

Naik, M.N.

Pesticides (BOMBAY), 5(8), 24-26; 1971

DDT; PESTICIDES; SOILS; FATE

779
Hygienic Evaluation of Soil Polluted by a Mixture of Organochlorine Pesticides

Vaishtein, S.I.A.; Vashkulat, N.P.; Bezborod'ko, M.D.

Gigiena I. Sanit., 34(9), 30-3; 1969

DDT; HEXACHLORANE; MIGRATION; UPTAKE; PLANTS; POTATOES; CLAY; SAND; CHERNOZEM; PESTICIDES; SOILS; MOISTURE; AMMONIA-NITROGEN; PH; AMMONIFICATION; NITRATES; SPORES; FUNGI; MIGRATION; SANDY SOILS; ROOT CROPS; RESIDUES; PLOWING OVER; LIMING; ORGANOCHLORINE PESTICIDES

The stability of DDT and hexachlorane in various types of soil, the rate of their migration to deep soil and the conditions for their uptake by plants when applied to the soil surface during treatment of the aerial portions of crops were investigated. Potato was sown in lysimeters (2500 sq cm) with soil not containing the preparations. Three types of soil were employed: clay, sand and chernozem. The tubers were planted to a depth of 15 to 20 cm; the potato bush was dusted and sprayed when it reached a height of 15 to 30 cm. The two pesticides were applied at five times the usual rate to be certain that sufficient quantities would be present in the soils for the various determinations. In series I, a 12% dust of hexachlorane was applied at 350 kg/ha; in series II the dose was 1750 kg/ha. The respective doses of DDT (1.5% mineral oil emulsion were 800 and 4000 l/ha. Soil samples were drilled on the day of treatment and every other month to month and a half at depths of 0 to 10, 10 to 20 and 20 to 30 cm. At 9 months, soil samples were also taken at depths of 30 to 40 and 40 to 50 cm. The potatoes were harvested at 2 1/2 months. Besides the pesticides, pH, moisture, ammonia-nitrogen and the survivability of certain physiological groups of microorganisms which participate in the processes of self-cleaning were determined. Neither series of experiments showed inhibitory effects of the pesticides on the oxidation of protein substances to ammonia-nitrogen and nitrates; in individual cases, ammonification was even intensified at the end of the first month. The microorganisms count (spores and fungi) was not altered. Data from series I allowed no judgement about pesticide migration. In series II at 1 1/2 to 3 months, hexachlorane and DDT could both be detected at 20 to 30 cm in clay and sand but not in chernozem. By month 9, DDT had moved to 50 cm in sand and chernozem; at this time, hexachlorane was found in the surface layer of clay in very small amounts. Pesticide uptake by potatoes was significant, especially on sandy soil poor in organic matter. Analysis of the data suggests that a quantity of DDT and hexachlorane in the tillage layer of up to 0.1 mg/kg will not cause intensive contamination of root crops. A decrease in the soil residues of these two compounds can be accomplished by plowing over, liming and replacing the organochlorine pesticides with less stable compounds.

780
Microbial Transformation of 2,4-D and its Analogs

Nakajima, S.; Naito, N.; Tani, T.; Hoshi College Phar., 2-Chome, Ebara, Shinagawa, Tokyo, Japan

Chem. Pharm. Bull.(CPBTAL), , 21(3), 671-3; 1973

CHLOROPHENOXYACETIC ACID; FUNGICIDES; 2,4-D; TRANSFORMATION; 2,4,5-T; MCP; PHENOXYETHANOLS; MOLDS; REDUCTION; METABOLISM

Three molds, GLOCOSPORIUM OLIVARUM, GLOCOSPORIUM KAKI and SCHIZOPHYLLUM COMMUNE metabolized 2,4-D, 2,4,5-T and 2-methyl-4-chlorphenoxyacetic acid (MCP) to products having antifungal activity. The products were isolated and identified as the phenoxyethanols of the respective herbicides. Growth indices indicated that their antifungal activity was much greater than that of the parent compound. The fact that the herbicides [illegible] reduced in the presence of the molds contradicts the opinion that the herbicidic activity of 2-(2,4-dichlorophenoxy)ethanol on higher plants is operative after oxidation of 2,4-D.

781
Fixation of Heavy Metal Ions in Soil by 2,4,6-Trimercapto-S-Triazine Salts

Nakamura, Y.; Umehara, A.; Yamada, T.

Ger. Offen.(GWXXBX) 2240733 (a 01N), 20 Aug 1971, 17 p. (patent).; 1973

MERCAPTOTRIAZINE; FIXATION; METALS; SOILS; TRIAZINE; MERCURY; CADMIUM; LEAD; COPPER

782
Biodegradation of Paraquat Dichloride

Namdeo, K.N.

Indian J Exp Biol, 10(2), 133-135

STREPTOMYCES; NOCARDIA; BACTERIA; HERBICIDES; DEGRADATION; PARAQUAT; DICHLORIDE

783
Proteinase Enzyme as Influenced by Urea and Herbicides Applied to Grassland Oxisol

Namdeo, K.N.; Dube, J.N.; Jawaharlal Nehur Agric. Univ., Jabalpur, India

Indian J. Exp. Biol. (IJEBA6), 11(2), 117-119; 1973

UREA; HERBICIDES; ENZYME; SOILS; UREASE; DALAPON; PROTEINASE; PARAQUAT; GRASSLAND

784
Residual Effects of Urea and Herbicides on Hexosamine Content and Urease and Proteinase Activities in a Grassland Soil

Namdeo, K.N.; Dube, J.N.

Soil Biol. Biochem., 5(6), 855-859; 1973

DALAPON; UREA; HERBICIDES; HEXOSAMINE; UREASE; PROTEINASE; GRASSLAND; SOILS

785
Persistence of Dalapon in Grassland Soil. Persistence of 2,2-Dichloropropionic Acid in Mandla-Naikal Grassland Oxisol of Madhya Pradesh

Nandeo, K.N.; Jawaharlal Nehru Agric. Univ., Rewa, India

Plant Soil(PLSOA2), 37(2), 445-8; 1972

DALAPON; DEGRADATION; SOILS; MICROORGANISMS; HERBICIDES; BACTERIA

When dalapon was added to 27 California nonautoclaved soils, dalapon persisted up to 10 weeks in incubated soils. The microbial decomposition of dalapon in nonsterile soil increased with the increasing incubation time resulting in 2-4% recovery after 10 weeks. In perfused dalapon-treated soils, almost all of the herbicide was decomposed within 5 days. Addition of erythromycin to perfused dalapon-treated soils, resulted in a 43% degradation in contrast to a 63 and 58% degradation after mycostatin and isoniazid antibiotics, respectively, were added to the perfused system. Dalapon-decomposing bacteria in the soil remained elevated even after 6 months of dalapon application.

786
Extraction and Identification of Endrin and Heptachlor Degradation Products

Nash, R.G.; Beall, M.L.

J Assoc of Anal Chem. 54(4), 959-963

EXTRACTION; ENDRIN; HEPTACHLOR; DEGRADATION; SOYBEANS; INSECTICIDES; RESIDUES; GAS LIQUID CHROMATOGRAPHY; THIN LAYER CHROMATOGRAPHY

787
Endrin Transformations in Soil

Nash, R.G.; Beall, M.L.; Harris, W.G.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Maryland

J. Environ. Qual. (JEVQAA), 1(4), 391-4; 1972

ENDRIN; TRANSFORMATION; SOILS; INSECTICIDES; DEGRADATION; PH; ENDRIN DELTA KETONE; ENDRIN ALDEHYDE; TRACER; CARBOXALDEHYDES; POTASSIUM HYDROXIDE; SULFURIC ACID

Endrin was converted by a soil with pH 6.4 into endrin delta ketone (1,8,9,9,10,11-Hexachloropentacyclo(6.3.0.12,5.03,7.06,10) Dodecan-12-one) endrin alc. (1,8,9,9,10,11-Hexachloropentacyclo(6.3.0.12,5.03,7.06,10.011,12) dodecan-12-ol) , a product tentatively identified as endrin aldehyde (1,8,9,9,10,11-hexachloropentacyclo(6.3.0.02,11.03,7.06,10) undecan-12 -carboxaldehyde), and possibly 2 other compounds. The experiments were carried out using endrin-carbon-14. The degree of endrin transformation increased with soil depth. In a dry soil with ph 4.2, endrin was transformed into some endrin delta ketone, and probably endrin aldehyde. No trasformation was noted in this soil under moist conditions. Acid or base treatment of endrin-endrin aldehyde at 0-100 degrees indicated that endrin was stable in the presence of 60% KOH but not in the presen ce of H2SO4. endrin delta ketone-endrin aldehyde were stable under all treatments tested, except for endrin aldehyde which was unstable in KOH at 100 degrees.

788
Soil Moisture Influence on Treatment and Extraction of DDT from Soils

Nash, R.G.; Harris, W.G.

J Assoc Off Anal Chem, 55(3), 532-536; 1972

INSECTICIDES; SOILS; SOIL MOISTURE; EXTRACTION; DDT

789
Chlorinated Hydrocarbon Insecticide Residues in Crops and Soil

Nash, R.G.; Harris, W.G.; Agr. Res. Cent., Agric. Res. Serv., Beltsville, Md

J. Environ. Qual.(JEVQAA), 2(2), 269-73; 1973

INSECTICIDE; PERSISTENCE; SOILS; SOYBEANS; RESIDUES; CHLORDANE; TOXAPHENE; LOAM; CONGAREE SANDY LOAM; DIELDRIN; ISODRIN; ENDRIN; HEPTACHLOR; BHC; TOXAPHENE; DILAN; BHC; TRANSFORMATION; CORN; OATS; WHEAT; PENTACHLOROCYCLOHEXANE; CROPS; SANDY LOAM

Residues of aldrin, dieldrin, isodrin, endrin, heptachlor, chlordane, bhc, toxapheme, or dilan were detected in congaree sandy loam 16 years after application. Soybeans grown from seeds planted in these test plots 15 years after the initial application contained residues of dieldrin, endrin, heptachlor epoxide, alpha and gamma BHC, endrin tr ansformation products, and pentachlorocyclohexane. Only BHC and dieldrin were found in corn, oats, and wheat, which were planted at the same time as the soybeans.

790
Soil Moisture Influence on Treatment and Extraction of DDT from Soils

Nash, R.G.; Harris, W.G.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

J. Ass. Off. Anal. Chem.(JANCA2), 55(3), 532-6; 1972

ALKALI; SOILS; DDT; EXTENTION; ORGANOCHLORINE INSECTICIDES; DDE; SOILS; INSECTICIDES

Techniques were devised to prevent the conversion of p,p'-DDT into p,p'-DDE during the DDT treatment, or extraction of highly alkali soils. Moistening soils to near field capacity reduced DDT conversion into DDE during treatment. A new column extraction method was developed which prevented further conversion during extractions. The column extraction was more rapid but less efficient thant the Soxhlet extration. About 4% DDT remained after column extraction of incubated soils, whereas only about 1% remained in Soxhlet-extracted soils.

791
Comparative Extraction of Chlorinated Hydrocarbon Insecticides from Soils 20 Years After Treatment

Nash, R.G.; Harris, W.G.; Ensor, P.D.; Woolson, E.A.

J Assoc Off Anal Chem, 56(3), 728-732

ENDRIN; TOXAPHENE; DILAN; BHC; ISOMERS; ISODRIN; ALDRIN; DIELDRIN; HEPTACHLOR; INSECTICIDES; CHLORINATED HYDROCARBONS

792
Soil pH and Metallic Amendment Effects on DDT Conversion to DDE

Nash, R.G.; Harris, W.G.; Lewis, C.C.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md

J. Environ. Qual.(JEVQAA), 2(3), 390-4; 1973

DDT; SOILS; DDE; PH; MAGNESIUM; MAGNESIUM OXIDE; CONVERSION; WATER; SOIL MOISTURE

The conversion of DDT to DDE was enhanced in both MgO-amended and nonamended high pH soils (amended, pH 9; nonamended, pH 7.5). The DDT to DDE conversion occurred over a 32 month period, and 15% of the original DDT was converted to DDE by the end of that time. The predominant conversion mechanism of DDT in dry soils seems to be chemical, whereas in moist soils it is microbial.

793
Determining Phytotoxic Pesticide Interactions in Soil

Nash, R.G.; Jansen, L.L.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md.

J. Environ. Qual.(JEVQAA), 2(4), 503-10; 1973

PESTICIDES; SOILS; STATISTICAL ANALYSIS; PLANTS

Data on plant responses to pesticide interactions in soil were evaluated statistically. Regression estimation analysis can identify, characterize, and experss magnitude of a physiological interaction. Variance analysis indicates only the presence of an interaction, Duncan's Multiple Test Range identifies an interaction, and the method of S.R. Colby (1967) indicates magnitude of differences. The regression estimates analysis overcomes some of the statistical and interpretive limitations of the heretofore used Duncan's Multiple Range Test and Colby's method for phytotoxic interactions.

794
Loss of Diazinon from Dacca Paddy Field Soils

Nesim, A.I.; Baig, M.M.H.; Lord, K.A.; Toxicol. Pestic. Lab., Dept. Plant Protection, Karachi 27, Pakistan

Pak. J. Sci. Ind. Res., 15(4-5), 330-332; 1972

MICROFLORA; INSECTICIDES; DEGRADATION; MICROBIAL ACTIVITY; HEAT; PADDIES; SOILS; DECOMPOSITION; ADSORPTION; MICROORGANISMS; REACTION PRODUCTS; DIAZINON

Approximately 30% of the diazinon exposed to six different paddy soils in still percolating water was decomposed in four hours. No significant degradation took place with the absence of soil. Decomposition was negligible after heat sterilization of the soil, and a brown growth, which was isolated from the soil and was possibly an actinomycete, degraded the pesticide. Degradation was proportional to time and concentration of organism only until about 50% of the diazinon had disappeared, suggesting that decomposition was dependent on diazinon concentration or inhibited by the reaction products. Very little adsorption of the pesticide took place when one of the soils was exposed briefly to diazinon solution.

795
Persistence of Parathion in Soil and its Translocation into Tomato Plants

Nassif, F.M.

Bull. Entomol. Soc. Egypt Econ. Ser., 5, 73-78; 1971

ABSORPTIOMETER; PERSISTENCE; PARATHION; SOILS; TRANSICCATION; TOMATOES; PLANTS

796
Effects of some Environmental Factors on the Reaction of the Soil Microflora to Pesticides

Naumann, K.; Inst. Phytopathol. Aschersleben, Dtsch. Akad. Landwirtschaftswiss., Berlin, East Germany

Zentralbl. Bakteriol., Parasitenk., Infektionskr. Hyg., Abt. 2(ZBPIA9), 127(4), 379-96; 1972

PESTICIDES; SOILS; ACTINOMYCETES; VAPAM; DAZOMET; ALLYL ALUMINUM CARBIDE; FORMALIN; WATER; WATER-BINDING; DECOMPOSITION; DEHYDROGENASE; INHIBITION; GREENHOUSE

Vapam (0.15%), dazomet (420 ppm), allyl AlC (200 ppm), and formalin (0.2%), added to soil in greenhouse boxes, inhibited growth of bacteria and actinomycetes for a longer period at 12-15 degrees than at 20 degrees. Inhibition of bacteria by these preperations was greater at low or high soil moisture (40 or 80% water-binding capacity) than at intermediate soil moisture (60%), whereas actinomycetes were inhibited most strongly at intermediate and high soil moisture. Dehydrogenase activity was generally increased and cellulose decomposition decreased more in moist than in dry soil. Covering the treated soil with gas-impermeable plastic film prolonged the inhibitory action of the pesticides.

797
Decomposition of Parathion by Soil Bacteria

Naumann, K.

Phytopathol. Z., 60, 343-57; 1967

DECOMPOSITION; PARATHION; BACTERIA; SOILS

798

The Stability of Certain Phosphororganic Pesticides in the Soils

Nayshteyn, S.Y.; Zhulinskaya, V.A.; Yurovskaya, Y.M.; Kiev O.M. Marzeyev Sci. Res. Inst. Pub. Commun. Hyg., Kiev, USSR

Gig. Sanit., 38(7), 42-45; 1973

STABILITY; DECOMPOSITION; TRICHLORFON; CARBOFOS; MALATHION; METAPHOS; METHYL PARATHION; SOILS; PESTICIDES; ACIDIC SOILS; PERSISTENCE; RETENTION; MICROORGANISMS; ORGANOPHOSPHORUS; ALKALINE SOILS

The stability and decomposition of trichlorfon, carbofos (malathion), and metaphos (methyl parathion) in artifically acidified and alkalinized soils with the respective pH ranges of 3-4.6 and 8.7-9.6 were studied. The pesticides were applied at 2 and 200 mg/kg with the soil temperature at 18-20 C. Stability increased in all pesticides investigated in acidic soils. Trichlorfon concentrations of 200 mg/kg persisted for two months, but for only one month in alkaline soil where persistence was found a function of the initial concentration. Trichlorfon in a concentration of 200 mg/kg persisted in the soil for one month but at 2 mg/kg concentration was no longer detectable after one month. The retention was longest in acidic soil, especially for high pesticide concentrations. The persistence in the soil decreased from metaphos to carbofos and to trichlorfon. Since the rate of decomposition in native and sterile soils was comparable, it can be concluded that the role of the soil microorganisms in the destruction of trichlorfon, metaphos and carbofos is of secondary importance compared to that of chemical reactions.

799

Stability of Certain Organophosphorus Pesticides in the Soil

Nayshteyn, S.Y.; Zhulinskaya, V.A.; Yurovskaya, Y.M.; Kiev. Nauchno-Issled. Inst. Obshch. Kommunal'N. Gig. Im. Marzeeva, Kiev, Ussr

Gig Sanit.(GISAAA), (7), 42-5; 1973

INSECTICIDES; SOILS; DEGRADATION; METAPHOS; CARBOPHOS; CHLOROPHOS; PH; DEGRADATION; STABILITY; ORGANOPHOSPHORUS PESTICIDES; PESTICIDES

The stabilities of metaphos, chlorophos, and carbophos in the soil depended upon their structures, the soil activities, and the initial concentrations of the insecticides. These pesticides were retained longer in acidic soils if their initial concentrations were substantial. These pesticides were not primarily degraded by soil microorganisms.

800

Hydrolysis of Propazine by the Surface Acidity of Organic Matter

Nearpass, D.C.; U.S. Dept. of Agriculture, Beltsville, Md

Soil Sci Soc Am Proc, 36(4), 606-610; 1972

HERBICIDES; ADSORPTION; PH; PROPAZINE; HYDROLYSIS; ORGANIC MATTER

Propazine (2-chloro-4, 6-bis(isopropylamino)-s-triazine) hydroylsis in acidic aqueous soil-free systems was pH dependent, increasing with lower pH values. At a given pH, degradation followed first-order kinetics. At 23.5c, the relationship was log t(1/2) (days) = 0.59 pH -0.21. adsorption of propazine by organic matter prepared from Michigan peat was also pH dependent, but both molecular and cationic adsorption occurred. An increased rate of degradation in the presence of organic matter was postulated as due to hydrolysis by ionized surface hydrogen. Increasing the calcium saturation resulted in decreased hydrolysis. Increasing the CaCl1 concentration of the propazine-organic matter-aqueous system had no effect on acid hydrolysis. In the salt-amended systems, an increased hydrolysis, to be expected from the lower pH in the ambient solution, was apparently offset by a decreased hydrolysis due to the lowered amounts of ionized surface hydrogen.

801

Adsorption Interactions in Soils Between Amitrole and S Triazines

Nearpass, D.C.

Soil Sci Soc Amer Proc, 35(1), 64-68; 1971

PROMETONE; HERBICIDES; ORGANIC MATTER; ACIDITY; ADSORPTION; SOILS; AMITROLE; S-TRIAZINE; TRIAZINE

802

Persistence of Foliar Protective Fungicides

Neely, D.

Phytopathology 60 (11). 1970 1583-1586.

PERSISTENCE; FUNGICIDES; PESTICIDES

803

Biodegradation of Phenylmercuric Acetate by Mercury-Resistant Bacteria

Nelson, J.D.; Blair, W.; Brinckman, F.E.; Colwell, R.R.; Iverson, W.P.; Dep. Microbiol., Univ. Maryland, College Park, Md.

Appl. Microbiol.(APMBAY) 1973, 26(3) 321-6; 1973

PHENYLMERCURIC ACETATE; BACTERIA; MERCURY; DEGRADATION; PHENYLMERCURIC ACETATE

804
Fate of Trace-Metals (Impurities) in Subsoils as Related to the Quality of Ground Water.; Final Rept.

Nelson, W.E.; Tuskegee Inst., Ala. Carver Research Foundation.

Proj. OWRR-B-028-ALA; Contract DI-14-01-0001-3053; Monitoring Agency Report No. W73-07802, OWRR-B-028-ALA(3); PB 219402/7; 181 p.; 1972, September

WATER; GROUND WATER; TRACE ELEMENTS; SOIL CHEMISTRY; AGRICULTURAL WASTES; PRECIPITATION; ADSORPTION; RUNOFF; METALS; CHELATION; LIGANDS; FERTILIZERS; COMPOSITION; ION EXCHANGE; PESTICIDES; TRANSPORT; SOILS; SUBSOILS

The report presents findings of a two-year study of the ground water pollution hazard from trace-metals which are applied in agricultural chemicals. The study establishes whether movement through the soil constitutes a significant source of trace-metals found in surface and ground water, identifies the properties of soils that control the extent of (quantity of) metals moving in and through the soil, establishes the relation of this movement to the concentration of the various metals in the water originating on agricultural lands, and examines the possible use of cationic polymers or other organic compounds in controlling the extent of trace-metals in water.

805
Action of Atrazine and Simazine on the Soil Fungi, and Decomposition of the Herbicides in Soil

Nepomiluev, V.F.; Kuzyakina, T.I.; Mosk. S.-Kh. Akad. Im. Timiryazeva, Moscow, Ussr

Biol. Nauki(BINKBT), 15(8), 127-31; 1972

ATRAZINE; DECOMPOSITION; SOILS; FUNGI; SIMAZINE; TRIAZINE; HERBICIDES; DEGRADATION

The effects of tirazine herbicides on soil fungi depended on the physiochemical properties of the herbicide and on the species of microorganism used. Simazine and atrazine were both used as nutrient sources by MUCOR SPINOSUM, ASPERGILLUS NIGER, and PENICILLUM TARDUM cultures. Atrazine labeled with 14C was degraded to 14CO2 by the microorganisms in various types of soil. Thermal and chemical sterilization prevented atrazine breakdown in soil samples. The most intensive and most rapid deradation of atrazine occurred in peat-bog type soil. As the atrazine concentration increased, the intensity of herbicide degradation increased as did the time period required for atrazine decomposition. Inoculation of sterile soil with P. TARDUM restored the biological activity of the soil.

806
Movement and Distribution of NIA-23486 in Various Soil Types

Nethery, A.A.

Proc. Northeast Weed Sci. Soc., 28, 133-139; 1974

6 TERTBUTYL-3-ISOPROPYLISOXAZOLO; 3 4-D PYRIMIDIN-4 5H-ONE; HERBICIDES; ADSORPTION; CATION EXCHANGE; MOVEMENT; DISTRIBUTION; SOILS; NIA-23486

807
Persistence of Benomyl and Thiophanate Compounds in Soil and Various Plants Following Soil Application

Netzer, D.; Dishon, I.; Volcani Cent., Agric. Res. Organ., Bet Dagan, Israel

Phytoparasitica(PHPRA2) 1973, 1(1) 33-7; 1973

FUNGICIDES; PERSISTENCE; SOILS; PLANTS; BENOMYL; THIOPHANATE; TOMATOES; PEPPERS; EGGPLANT; MUSKMELONS; DRENCH APPLICATION; LEAVES

Benomyl and thiophanate methyl-NF44 were taken up in tomatoes, peppers, and eggplants following a soil application and persisted in the plants for 8 weeks following application. Thiophanate-NF35 could be detected only in the bottom leaves of pepper and eggplant for 4 weeks after application. Benomyl persisted in muskmelons and soil throughout the growing season, following a single soil drench application.

808
Studies on the Behavior of Herbicides in the Soil

Neururer, H.; Bundesanstalf fur Pflanzenshcutz, Wien, Austria

Bodenkultur 23 (2). 1972 138-172.

CRESS; ROOTS; RAINFALL; HUMUS; TEMPERATURE; HERBICIDES; LENACIL; PCA; CROPS; SOILS; DEGRADATION; MONTMORILLONITE; CHERNOZEM; SMONITZA

The results of field trials conducted on a chernozem and a smonitza carrying conventional rotations of field corps showed that the inactivation of herbicides was accelerated by increasing rainfall, high temperature and increasing humus content, whereas drought and low temperatures inhibited their degradation. Humus levels greater than 2% increased the risk of damage to crops, while those less than 6% tended to result in insufficient control. Experiments with PCA and lenacil showed that they were readily absorbed into the crystal lattice of montmorillonite. (130 references)

809
Data on the Strip Spraying of Herbicides in the Soil

Neururer, H.

Pflanzenschutz Ber 41 (1-2). 1970 3-23.

SUGAR BEETS; PHYTOTOXICITY; STRIP SPRAYING; HERBICIDES; SOILS

810
Determination of Dinitramine Residues in Soil and Plant Tissue

Newsom, H.C.; Mitchell, E.M.; U.S. Borax Res. Corp., Anaheim, Calif.

J. Agr. Food Chem.(JAFCAU) 20(6) 1222-4; 1972

DINITRAMINE; GAS CHROMATOGRAPHY; HERBICIDES; SOILS; RESIDUES; PERSISTENCE; METHYLOXIDE EXTRACTION; FLORISIL COLUMN CHROMATOGRAPHY; ELECTRON-CAPTURE GAS CHROMATOGRAPHY; NITROGEN; GAS; FORAGE; CROPS; IONIZATION; PLANTS

Dinitramine residues are determined by a method which involved MeOH extraction, Ch2C12 partitioning, florisil column chromatography, and meaurement by electron-capture gas chromatography. The column was packed with gf-1 on varaport-30. N was used as a carrier gas. The column temperature was 200 degrees. The method was applicable to soil, forage, and crop samples, and gave good recoveries at geq.0.01 ppm without subtraction of blanks. An alternative method utilized the same extraction and cleanup, but with alkali flame ionization detection. The latter method was also quantative at 0.01 ppm. Application of these procedures to field samples demonstrated that dinetramine is readily degraded by environmental conditions over the growing season. Soil residues were less than 10% of application levels in 100 days, while mature plant tissue and crop samples contained less than 0.01 ppm dinetramine.

811
Photolysis of the Herbicide Dinitramine (N3,N3-Diethyl-2,4-dinitro-6-trifluoromethyl-m-phenylenediamine)

Newsom, H.C.; Woods, W.G.; U.S. Borax Corp., Anaheim, Calif.

J. Agricultural & Food Chemistry, 21(4), 598-601; 1973, July-August

DEGRADATION; PHOTOLYSIS; DINITRAMINE; HERBICIDES; COLUMN CHROMATOGRAPHY; THIN-LAYER CHROMATOGRAPHY; RECRYSTALLIZATION

The degradation rate and products obtained on photolysis of dinitramine are described. Sunlight irradiation of a dilute aqueous solution of dinitramine resulted in rapid decomposition; sunlight photolysis was also rapid in naturally occurring waters. After irradiation, the product mixtures were separated into pure components by column chromatography, thin-layer chromatography, and recrystallization.

812
Possibility of Relating the Dosage of Preemergent Herbicides to Soil Properties

Niemann, P.; Biol. Bundesanst. Land-Forstwirtsch., Inst. Unkrautforsch., Brunswick, Germany

Nachrichtenbl. Deut. Pflanzenschutzdienstes (Brunswick)(NDPBA6) 1973, 25(1) 11-14; 1973

REVIEW; SOILS; HERBICIDES; FATE; PYRAZONE; ENDOTHAL; HUMUS; CLAY; SAND; USAGE; ADSORPTION

A review with 27 references on the fate of herbicides such as pyrazone and endothal in the soil. The concentration of various herbicides in the soil was related to soil properties. that is, humus content, clay, and sand. The practical use of herbicides under a wide range of soil conditions was discussed and determination of an adsorption or activity index for each herbicide in various soils was recommended.

813
Adsorption of Pesticides to Clay and Humus Colloids in Soils

Niemann, P.; Maas, G.; Biol. Bundesanst. Land-Forstwirtsch., Inst. Unkrautforsch., Brunswick, Germany

Schriftenr. Ver. Wasser-, Boden-, Lufthyg., Berlin-Dahlem(SVWLAE) 1972, No. 37,() 155-65; 1972

REVIEW; PESTICIDES; ADSORPTION; COLLOIDS; DESORPTION; CATIONS; ION-DIPOLE; PHENYLUREA; ATRAZINE; CALCIUM; MAGNESIUM; POTASSIUM; SODIUM; PROTONATION; HYDROGEN BRIDGE; REDUCTION; ELECTROLYTES; SALTING OUT; AMITROLE; CALCIUM CHLORIDE; WATER; CLAY; HUMUS; SOILS

Studies on interactions between soil colloids and adsorbed pesticides along with factors influencing adsorption processes are reviewed. Both adsorption and desorption of pesticides may be influenced by the presence and nature of cations at the adsorption site. The formation of montmorillonite-cation-2,4-D complex was noted. Ion-dipole bonding takes place between phenylurea derivatives and cations. Adsorption of simazine and atrazine is reduced on clayey soil saturated with calcium, magnesium, potassium and sodium ions. Protonation, hydrogen bridge formation, and competition of pesticides and other adsorbates are regarded as determining factors in adsorption processes. Surfactants may enhance or inhibit the adsorption of pesticides on soil components. The reduction in solubility of the active agent in the presence of electrolytes (salting out) may increase adsorption while salt cations may displace the protonated active agent from the colloid surface. A reduction in the sorption of amitrole with increasing calcium chloride concentration was observed. Water molecules and natural organic soil components may also modify pesticide adsorption.

814
Decomposition of Triazine Herbicides

Nikolova, G.; Bulgaria

Selskostop. Nauka(SEMAAL) 1973, 12(1) 67-70; 1973

REVIEW; TRIAZINE; DECOMPOSITION; METABOLISM; SOILS; PLANTS; HERBICIDES

A review on the biological and nonbiological factors of the decomposition of triazine herbicides in the soil. The metabolism of triazine herbicides by plants is also mentioned

815

Microbiological Activity and Breakdown of Casoron Herbicide in the Soil

Nikolova, G.; Bakalivanov, D.; Kostinbrod Stn., Plant Prot. Inst., Sofia, Bulgaria

Symp. Bio. Hung. (SYBHAK) 1972, 11, 385-9; 1972

CASORON; BACTERIA; ACTINOMYCETES; FUNGUS; HERBICIDES; SOILS; MICROFLORA; GROWTH; GREENHOUSE

The herbicide, casoron (7.5 kg active ingredient /ha), inhibited the growth of soil bacteria, actinomycetes, and fungi for up to 90 days. Soil cultures of azctobacter species were only slightly inhibited by carscron. Carsoron detoxication was more rapid in greenhouse studies than in field studies, where carsoron was detected up to 150 days after application.

816

Biological Degradation of Hydrocarbons with Special Reference to Soil Contamination

Nissen, T.V.

Tidsskr Planteavl 74 (3). 1970 391-405.

HERBICIDES; GAS CHROMATOGRAPHY; DEGRADATION; SOILS; WEEDKILLERS; HYDROCARBONS; MICROORGANISMS

After addition of weedkiller oil to soil, determination of CO2 production and gas chromatography and microbiological analyses were carried out. In 4 weeks, greater than or equal to 15% of the added weedkiller had been degraded by the micro-organisms.

817

Less Toxic Herbicides for Soil Application in Transplanted Paddy Rice--Evaluation and Some Herbicidal Properties.

Noda, K.; Eguchi, S.; Ozawa, K.; Kyushu Agricultural Experimental Station, Chikugo, Fukucka, Japan

Bull. Kyushu Agric. Exp. Stn., 15, 59-123; 1970

MOVEMENT; CLAY; NITROFEN; PROMETRYNE; MOBILITY; PERSISTENCE; MCPCA; DCBN; DBN; CNP; NIP; PCP; SOILS; PADDIES; RICE; HERBICIDES; VOLCANIC SOILS

In general, the downward movement of herbicides in soil columns was less in alluvial volcanic soil than in clay soil. For NIP (Nitrofen), PCP and Prometryne it was greater at low temperatures. For clay soil the order of mobility was DCBN greater than DBN greater than MCPCA greater than PCP greater than Prometryne greater than CNP equals NIP. Persistence in soils was in the order: Prometryne greater than MCPCA, DCBN greater than DBN greater than CNP equals NIP greater than PCP.

818

The Kinetics of Adsorption and Desorption of 2,4-D, 2,4,5-T, Picloram and Amitrole on Forest Floor Material

Norris, L.A.

Res. Progr. Rep. West Soc., Weed Sci., 103-5; 1970

ADSORPTION; 2,4-D; 2,4,5-T; PICLORAM; AMITROLE; AMINOTRIAZOLE; FORESTS; HERBICIDES; ALIQUOTS; DESORPTION

The speed and degree of adsorption of 2,4-D, 2,4,5-T, picloram and amitrole (aminotriazole) on forest floor material were found to vary with the herbicide. Air-dried forest floor material (L, F and H horizons) from a red alder (ALNUS RUBRA) stand was shaken with the following herbicides: C-14-carboxyl labeled 2,4-D, 2,4,5-T picloram (all at 30 degrees) and amitrole-5-C-14 at 52 degrees. The ratio of absorbent to liquid was 1:10 and the concentration of the herbicide 0.000010 M. Aliquots were filtered at intervals from 5 to 360 minutes and the radioactivity measured in a liquid scintillation counter. Desorption was assessed by equilibrating the solvent with 0.000010 M herbicide, removing the unbound liquid phase and then adding fresh buffer. Aliquots were withdrawn as before. At equilibrium (30 degrees), 34% of the 2,4-D originally in solution was sorbed compared to 61% for 2,4,5-T, 27% for picloram and 72% for amitrole. Amitrole required 2580 minutes to reach equilibrium at 30 degrees but only 960 minutes at 52 degrees. Adsorption and desorption kinetics were smiilar for 2,4-D and 2,4,5-T. Initially, the desorption of picloram was more rapid than its rate of adsorption. Desorption of amitrole was slower than adsorption and the original equilibrium was not reached; the degradation of amitrole observed in a previous study may account for this.

819

Degradation of Herbicides in the Forest Floor.

Norris, L.A.; Forestry Sciences Laboratory, Corvallis, Oregon

Part of "Tree Growth and Forest Soils", Proceedings of the Third North American Forest Soils Conference, North Carolina State University, Raleigh, August 1968. Youngberg, C.T. and Davey, C.B. (Eds.). Corvallis, Oregon State University, (p. 397-411); 1970

REVIEW; HERBICIDES; DEGRADATION; FOREST SOILS; FORESTS; SOILS

A review in which the rates of degradation of a number of herbicides are compared. (27 references)

820

Environmental Contamination by Agrochemicals and Their Residues in Soils

Nose, K.; Natl. Inst. Agric. Sci., Tokyo, Japan

Eisei Kagaku(ESKGA2), 19(4) 177-88; 1973

REVIEW; PESTICIDES; RESIDUES; DDT; SOILS; WATER; CROPS; DICOFOL; ETHYLTHIOMETON; PERSISTENCE; BHC; DECOMPOSITION; ORGANOMERCURY FUNGICIDES; FUNGICIDES; DEGRADATION; HYDROLYSIS; LEPTOPHOS; APROCARB; DIMETHOATE; BASSA; MEOBAL; HERBICIDES; HALF-LIFE; INSECTICIDES; ROUTES; ESTERS; HYDROXYLATION; AROMATIC RINGS; DICOFOL; TETRADIFON; ENDOSULFAN; MTMC; ALKYLATION; AGROCHEMISTRY

The ideal pesticide has now greatly changed from one of strong persistency to weak persistency: the safety evaluation of a pesticide has also changed from acute toxicity to chronic toxicity. Pesticide residues in crops and in soil are now a great problem is review refers to Silent Spring and then the dynamic status of DDT seen from the global viewpoint and calculated by a simulated system by randes. The theoretical residue amounts of repeatedly applied and continously decomposed pesticides is presented. Experimental results on pesticide residues are shown for BHC and organomercury fungicide as are typical degradation routes of ester pesticides such as hydrolysis and hydroxylation of n-alkyl and aromatic rings. N-hydroxylation and de-alkylation are indicated on representative pesticides. Relatively stable intermediate compounds are shown. With DDT and BHC banned the present pesticides which are relatively resistant to microorganisms in the soil are dicofol, tetradifon, and endosulfan. The pesticides which showed persistency more than a month in soil are ethyl-thiometon, dimethoate, leptophos, bassa (o-sec butyl-phenly N-methylcarbamate), aprocarb, MTMC, and meobal. There are many herbicides having a half-life in soil of more than one month; however, the time of application is only once a year. These are applied early in the year, and residues in crops would be far less than those of insecticides and fungicides.

821

Effect of Organic Carbon Contents and Temperature of Soil on Decompositions of Nogos 50 Ec

Nowak, A.; Swarcewicz, M.; Wybieralski, J.; Akad. Roln., Szczecin, Pol.

Zesz. Nauk. Wyzsz. Szk. Roln. Szczecinie(ZNRNSAQ), No. 9, 253-8; 1972

NOGOS; DECOMPOSITION; SOILS; ORGANOPHOSPHORUS INSECTICIDES; INSECTICIDES

822

Effect of Soil Mechanical Composition and Temperature on DDVP Decomposition in Soil

Nowinska, J.; Wybieralski, J.; Inst. Gleborn. Melior., Akad. Roln., Szczecin, Poland

Zesz. Nauk., Akad. Roln. Szczecinie(ZARSA8), (38) | 299-303; 1972

DDVP; DECOMPOSITION; SOILS; TEMPERATURE; CLAY; PERSISTENCE; SANDY CLAY; COMPOSITION; INSECTICIDES

r0a ddvp aaDDVP

823

The Persistence of 2,4,5-Trichlorophenoxyacetic-Acid in Greenhouse Lysimeter Studies

O'Connor, G.A.; Wierenga, P.J.; Dept. of Agronomy, New Mexico State University, Las Cruces, NM

Soil Sci Soc Am Proc, 37(3), 398-400; 1973

HERBICIDES; MOVEMENT; DEGRADATION; BIOLOGICAL DETOXIFICATION; PERSISTENCE; LYSIMETER; 2,4,5-T

The persistence of 2,4,5-T was evaluated in an agricultural soil under favorable microbial conditions in lysimeters. Degradation was most rapid in a soil previously treated with the herbicide if extended periods of time did not separate herbicide additions. The degradation of 2,4,5-T was more rapid when the herbicide was applied at 40 ppm than when it was applied at 80 ppm. The time required for biological detoxification varied from 43 to 85 days depending upon pretreatment and concentration of the applied herbicide.

824

Behavior of Tritox-30 In Soil

Chuchowska, I.; Zakl. Hig. Komunaln., Panstw. Zakl. Hig., Warsaw, Poland

Rocz. Panstw. Zakl. Hig.(RPZHAW), 23(2), 147-54; 1972

TRITOX; SOILS; RESIDUES; DDT; METHOXYCHLOR; INSECTICIDES

In land patches treated with tritox 30, DDT and methoxychlor residues persisted up to 2 years after treatment. About 97.5-99% of the recovered insecticides occurred in the top 10 cm of the soil. The insecticides had also migrated to 100-400 cm beyond the treated area. Extensive flooding reduced DDT and methoxychlor levels by 37.5 and 50%.

825

Predicted Distribution of Organic Chemicals in Solution and Adsorbed as a Function of Position and Time for Various Chemical and Soil Properties

Oddson, J.K.; Letey, J.; Weeks, L.V.; Univ. California, Riverside, CA

Proc. Soil Sci. Soc. Am. 34, 412-417; 1970

EQUATIONS; PESTICIDES; SURFACTANTS; MODEL; MOVEMENT; DIFFUSION; ORGANIC CHEMICALS; DISTRIBUTION; ADSORPTION; MASS TRANSFER

Equations describing the mass transfer of organic chemicals (such as pesticides and surfactants) through soil are presented, suing a model with the assumed relationship Delta t = Alpha (Kc-S) where S= adsorbed concentration and c and t = solution concentration and time, respectively (K and Alpha being constants); movement by diffusion was assumed to be negligible.

826
Effect of Continuous Application of Herbicides on the Chemical Nature of Upland Soils

Oh, W.K.; Munic. Coll. Agric., S. Korea

Han'Guk Toyang Biryo Hakhoe Chi(PTBHAY), 6(1), 9-16; 1973

HERBICIDES; SOILS; LOROX; PH; HUMUS; CALCIUM; MAGNESIUM; SODIUM; POTASSIUM; 2,4-D; LASSO; PHENYL ETHER; PHENOXIDE; SODIUM PENTACHLOROPHENOXIDE; CARBON; WEEDS

Soil applications of the herbicide lorox (0.15 kg/10 are), decreased the ph, organic content, calcium, magnesium, and sodium of the soil and increased potassium application of 4 other herbicides, that is, 2,4-D, lasso, 2,4,6-trichlorophenyl 4-nitrophenyl ether, and sodium pentachlorophenoxide, increased the organic carbon content in the soil. The continuous application of herbicides may alter the weed species in the field

827
Gas Chromatographic Studies of Sorptive Interactions of Normal and Halogenated Hydrocarbons with Water-Modified Soil, Silica, and Chromosorb W.

Okamura, J.P.; Sawyer, D.T.; Dept. Chem., Univ. California, Riverside, CA 92502

Anal. Chem. 45(1), 80-84; 1973

SORPTION; ADSORPTION; WETTED SOILS; RETENTION; FUMIGANTS; SOILS; CHROMOSORB W; PORASILIC; HALOGENATED HYDROCARBONS; MODEL ECOSYSTEM; SOIL MOISTURE

The sorption characteristics of fumigants of the halogenated methane type were investigated by GC, using columns of wetted soil, silica (Porasils B and C), and Chromosorb W. Adsorption on the water surface and absorption by the water layer were the principal interactions with the wetted soils since retention of the fumigants decreased with decreasing water content. Results were more reproducible when soils were brought to desired water content by desorption. Water on Chromosorb W or Porasil C appeared to be a good model for water on soil at all but very low water contents. Data from the model systems makes it possible to calculate the amount of water on the soil surface, the surface area of the aqueous layer, and retention volumes of various compounds. (21 refs)

828
Solubilization by Biochemical Means of Arsenic Bound to Iron in the Soil

Olivier, H.R.; Le Peintre, M.

Ann. Inst. Pasteu, 88, 668-671; 1955

IRON; SOILS; ANAEROBIC FERMENTATION; ARSENIC

The anaerobic fermentation or organic substances dissolves by reducing the Fe in soil and causing the As to pass into solution.

829
Residues of Aldrin, Dieldrin, Chlordane and DDT in Soil and Sugar Beets-D

Onsager, J.A.; Rusk, H.W.; Butler, L.I.; U.S. Department of Agriculture, Agricultural Research Service, Yakima, Washington

J Econ Entomol 63 (4). 1970 1143-1146.

PESTICIDES; RESIDUES; ALDRIN; DIELDRIN; CHLORDANE; DDT; SOILS; SUGAR BEETS; HALF-LIFE

The half-life in soil of aldrin was 3.1 months for 20 months, after which only 1% of the initial concentration remained. The half-life of the aldrin plus dieldrin was 8.5 months for 20 months, then, for dieldrin alone, the half-life was 29.7 months. Chlordane and DDT half-lives were 14.3 and 22.9 months, respectively.

830
The Bacterial Oxidation of N Methyl Iso Nicotinate

Orpin, C.G.; Knight, M.; Evans, W.C.

Biochem. J., 122(5), 58; 1971

SOILS; PARAQUAT; PESTICIDES; METABOLITES; OXIDATION; NICOTINATE

831
The Bacterial Oxidation of Picolinamide

Orpin, C.G.; Knight, M.; Evans, W.C.

Biochem. J., 122(5), 57-58; 1971

SOILS; DIQUAT; HERBICIDES; METABOLITES; OXIDATION; PICOLINAMIDE

832
An Approach to the Prediction of the Leaching of Herbicides in Soils

Osgerby, J.M.; Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingborne, UK

Proceedings, 11th British Weed Control Conference 2, 792-799; 1972

RESIDUES; CHLORTHIAMID; DICHLOBENIL; SOILS; METABOLITES; 2,6-DICHLOROBENZAMIDE; MATHEMATICAL MODEL; LEACHING; HERBICIDES; MODEL; VINEYARDS

The residue profiles of chlorthiamid and dichlobenil in four vineyard soils were determined by soil analysis for the metabolite 2,6-dichlorobenzamide.

833
Sorption of Un-ionised Pesticides by Soils

Osgerby, J.M.; Woodstock Agric. Res. Cen., Sittingbourne, Kent, England

Part of Sorption and Transport Processes in Soils. Monogr. Soc. Chem. Ind. No. 37 (63-78); 1970

REVIEW; ADSORPTION; PESTICIDES; SOILS; UN-IONISED PESTICIDES

A review of the mechanisms, measurement and effects of adsorption of un-ionised pesticides by soils. (34 references)

834
Processes Affecting Herbicide Action in Soil

Osgerby, J.M.

Pestic. Sci., 4(2), 247-258; 1973

ROOTS; ABSORPTION; ADSORPTION; DECOMPOSITION; EVAPORATION; LEACHING; MATHEMATICAL MODEL; SOILS; HERBICIDES

835
Studies on the Sorption of Monolinuron and its Availability to Some Plants

Ostrowski, J.; Industrial Organic Chemistry Institute, Warsaw, Poland

Roczniki Gleboznawcze, 23(1), 51-75; 1972

SORPTION; MONOLINURON; AVAILABILITY; PLANTS; PROPHAM; SOILS; ACTIVATED CARBON; EXCHANGE RESINS; FLORSIL; ADSORPTION; ORGANIC MATTER; PH; UPTAKE; WHITE MUSTARD; CORNFLOWER; BEANS; TRANSPIRATION; CLAY

The sorption of monolinuron and propham on soils, clays, activated carbon, exchange resins and Florsil were studied. Adsorption by soils depended upon soil type, particularly on soil organic matter content. Monolinuron and propham competed for adsorption sites in soil. Neither soil pH nor temperature affected adsorption. The availability and mechanism of uptake of monolinuron by white mustard, cornflower and beans were studied. Availability differed between plants and uptake was affected by plant transpiration rates.

836
Effect of Certain Carbamated and Phosphated Pesticides on the Soil Population Density of the Rotylenchulus-Reniformis of Cotton-D Gossypium-Barbadense-D

Oteifa, B.A.; Gibrail, M.A.; Sedky, E.M.

Agric Res Rev (Cairo), 48(3), 129-131; 1970

NEMATOCIDES; REPRODUCTION; CARBAMATES; PHOSPHATES; SOILS; COTTON; PESTICIDES

837
Chemical and Microbial Degradation of Ten Selected Pesticides in Aquatic Systems

Paris, D.F.; Lewis, D.L.; Natl. Environ. Res. Cent.-Corvallis, U.S. Environ. Prot. Agency, Athens, Ga.

Residue Rev.(RREVAH), 45, 95-124; 1973

REVIEW; PESTICIDES; MICROBES; HERBICIDES; INSECTICIDES; FUNGICIDES; DEGRADATION; AQUATIC ECOSYSTEMS; CARBAMATE; TRIAZINE; ORGANOCHLORINIC; ORGANOPHOSPHATES; SOILS; PERSISTENCE; WATER; MICROORGANISMS; POLYCHLORINATED BIPHENYLS

The work reported in the literature concerning the aquatic degradation of 10 selected pesticides is summarized. These compounds represent a broad range of currently used pesticide types, including PCBs, herbicides, insecticides, and a fungicide. These are representative of carbamates, triazines, organochlorines, and organophosphates. These pesticides are discussed in relation to their photochemical, chemical, and microbial degradation. These processes were mainly studied in soil systems. Aquatic studies of pesticides were primarily concerned with toxicity of pesticides to fish and algae and the persistence of pesticides in water. Little has been done to identify degradation products or to measure reaction rates.

838
Micrometeorological Measurement of Pesticide Vapor Flux from Bare Soil and Corn under Field Conditions

Parmele, L.H.; Lemon, E.R.; Taylor, A.W.; US Department of Agriculture, University Park, PA

Water, Air and Soil Pollution, 1(4), 433-45; 1972

VAPOR FLUX; CORN; MOVEMENT; DIELDRIN; HEPTACHLOR; EVAPOTRANSPIRATION; SOILS; WATERSHEDS; CROPS

Evaluation of the movement of dieldrin and heptachlor from a treated watershed was made by application of micrometerological estimates of evapotranspiration, using hourly data. The computation of vertical pesticide flux rate used the equation: F=Kz(delta p/delta z), where the vertical diffusivity coefficient Kz for the pesticide vapour is assumed equal to Kz for water as measured by micrometeorological methods. No major sources or sinks for the pesticide within the crop could be found and it was concluded that pesticide vapour flux was directly from the soil. Pesticide flux rate during nighttime hours was zero.

839
Soil Organic Matter Effect on Activity of Acetanilides, CDAA (N,N-Diallyl-2-Chloroacetimide), and Atrazine

Parochetti, J.V.; Dep. Agron., Univ. Maryland, College Park, Md

Weed Sci.(WEESA6), 21(3), 157-60; 1973

HERBICIDES; FOXTAIL; ORGANIC MATTER; SOILS; ATRAZINE; TRIAZINE; ALACHLOR; PROPACHLOR; ACETANILIDE; CHLOROACETIMIDES; CONTROL; HUMUS; CDAA

Generally, as the organic matter levels in the soil increased from 0.8 to 18.7%, the amount of triazine herbicides required to decrease the fresh top weight of giant green foxtail (SETARIA VIRIDIS) by 50% as compared to the control also increased. For alachlor propachlor, and CDAA (2-chloro-N,N-diallylacetamide) in field experiments there were no statistical differences in foxtail control between the chemicals at different rates or organic matter levels. However, atrazine control of foxtail was statistically lower with increasing organic matter levels, except for 2.6 kg atrazine/ha at 7% organic matter and 4.4 kg atrazine/ha at 7% and at 17% organic matter.

840
Volatility of Dichlobenil

Parochetti, J.V.; Hein, E.R.; Colby, S.R.

Weed Sci, 19(1), 28-31; 1971

HERBICIDES; VAPOR LOSSES; TEMPERATURE; SOILS; MOISTURE; VOLATILIZATION; DICHLOBENIL

841
Behavior of Potassium Azide in the Soil

Parochetti, J.V.; Warren, G.F.; University of Maryland, College Park, Maryland

Weed Sci, 18(5), 555-560; 1970

HERBICIDES; SOILS; FUMIGANTS; POTASSIUM AZIDE; VOLATILITY; DISSIPATION; LEACHING; SOIL MOISTURE; DIFFUSION; ADSORPTION; PH; TEMPERATURE; ALKALINE SOILS; ACID SOILS

Volatility (dissipation) of KN3 in soil was increased by an acid environment (due to rapid conversion to HN3), and decreased by increasing moisture (due to the water solubility of HN3). The chemical was weakly adsorbed by different soil types, and was subject to leaching. Dissipation of KN3 was accelerated by high temperatures and low ph, whereas it was prevented in alkaline soil; diffusion of KN3 in soil was restricted and only occurred in acid soil.

842
Degradation of Trifluralin Under Laboratory Conditions and Soil Anaerobiosis

Parr, J.F.; Smith, S.; U.S. Department of Agriculture, Baton Rouge, Louisiana

Soil Sci 115 (1). 1973 55-63.

PROPYL; SEQUENTIAL DEALKYLATION; NITRO GROUPS; REDUCTION; PHOTODECOMPOSITION; MICROBIOLOGICAL ACTIVITY; HERBICIDES; MICROORGANISMS; TRIFLURALIN; ANAEROBIC; AEROBIC; SOILS; DEGRADATION; LOAM; SILT

Photodecomposition of trifluralin in n-hexane solutions was rather slow at 200 ppm concentration, but was rapid at concentrations of 0.1-1 ppm. In a silt loam soil amended with lucerne meal, 99, 45 and 15% degradation occurred under moist anaerobic, flooded anaerobic and moist aerobic conditions within a period of 20 days. From the results of various treatments including autoclaving it was suggested that micro-organisms were involved in the initial degradation of trifluralin under anaerobic conditions.

843
Soil Anaerobiosis. Part 2. Effect of Selected Environments and Energy Sources on the Degradation of DDT

Parr, J.F.; Willis, G.H.; Smith, S.; Louisiana State University, Agricultural Experiment Station, Baton Rouge, Louisiana

Soil Sci, 110(5), 306-312; 1970

INSECTICIDES; ANAEROBIC; SOILS; DEGRADATION; DDT; DDD; DDE; LOAM; SOIL MOISTURE; FLOODING; METABOLITES

In glucose-amended crowley silt loam (pH 6.0) and arch loamy fine sand (pH 7.9) incubated aerobically in CO2 free air or anaerobically in Ar, N2 and N2 + CO2, DDT degradation followed the order: ar greater than N2 greater than N2 + CO2 (80:20) greater than CO2 free air. After 4-week incubation period, the degradation products were mainly DDD and some DDE. Flooding of soil was an ineffective degradation environment. The mean percent degradation of DDT in soil amended with lucerne meal, rice straw and rice hulls was 38% in CO2-free air, 41% in flooded soil and over 98% in moist soil incubated in N2 or Ar.

844
Fate of Atrazine and Paraquat in Three West Virginia Soils

Parra, L.A.; West Virginia Univ., Morgantown, W. Va.

Thesis, West Virginia University, Morgantown, West Virginia, 114 p.; 1971

ATRAZINE; PARAQUAT; SOILS; MINERALOGY

A disser.

845
Integrated Method for Trifluralin, Diphenamid, and Paraquat in Soil and Runoff from Agricultural Land

Payne, W.R.; Pope, J.D.; Benner, J.E.; Southeast Environ. Res. Lab., U.S. Environ. Protection Agency, Athens, GA

J. Agr. Food Chem. (JAFCAU), 22(1), 79-82; 1974

PARAQUAT; GAS CHROMATOGRAPHY; DIPHENAMID; TRIFLURALIN; COLORIMETRY; HERBICIDES; SOILS; RUNOFF; AGRICULTURE

846
Movement of Aldrin Heptachlor Residues in a Sloping Field of Sandy Loam Texture

Peach, M.E.; Schaffner, J.P.; Stiles, D.A.

Canadian J. of Soil Science, 53(4), 459-464; 1973, November

RESIDUES; PESTICIDES; SAND; TRANSPORT; ALDRIN; DIELDRIN; HEPTACHLOR; HEPTACHLOR EPOXIDE; LOAM; SOILS; TOBACCO FARMING; MOVEMENT; TOPOGRAPHY

The residues of aldrin, dieldrin, heptachlor, and heptachlor epoxide were investigated in Woodville sandy loam soils that had been used for tobacco farming. Movement of residues in a field demonstrates that concentrations of residues can be directly correlated with the topography of the land. The decrease is greatest at points of highest elevation and less at lower levels. The mode of transportation of pesticide through the soil is discussed.

847
Kinetics of the Decomposition in the Soil of C14-Labeled Urea as a Function of the Soil Moisture Content, the Introduction of Pesticides and Lime, and Soil pH

Pel'tser, A.S.; Timiryazev Agr. Acad., Moscow, USSR

Agrokhimiya, 10, 32-37; 1972

SOILS; TRACER; SOIL MOISTURE; PH; LIME: ATRAZINE; TRICHLORFON; MERCURY CHLORIDE; COPPER NITRATE; SILVER NITRATE; DECOMPOSITION; UREA; TEMPERATURE

The effects of soil moisture content, soil pH,, lime, atrazine, trichlorfon, mercury chloride, copper nitrate, and silver nitrate were studied on the rate of decomposition of C14-labeled urea in a laboratory test. The presence of atrazine, trichlorfon, copper nitrate, silver nitrate, and mercury chloride in the soil reduced the decomposition rate of urea. Two hundred mg of atrazine per kg of soil increased the time required (from 55 to 75 hours) for the decomposition of 10 mg of urea per 100 g of soil with 60% moisture content, a temperature of 18 C, and a pH value of 6.7. An equal dose of trichlorfon inhibited the total decomposition of urea in soil after 36 hours, by which time 80% of the total urea introduced was decomposed.

848
The Circulation of Pollutants in the Biosphere

Pesson, P.; Inst. Nat. Agronom., Paris

Econ. Med. Anim., 14/1, 3-10; 1973

DISPERSION; TROPHIC NETWORKS; CIRCULATION; TRANSPORT; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS; PESTICIDES; RADIOACTIVITY; BIOSPHERE; BIOTRANSFORMATION

The circulation of pollutants occurs mainly through two different yet complementary routes. Firstly, pollutants may be transported physically in their gaseous, solid or disolved state which lead to their progressive dispersion. Secondly, they may be transported by biologic means, using the extremely complex trophic networks which unite the organisms of terrestrial and aquatic ecosystems. The functional nature and environmental effects of these two routes of pollution circulation are examined and discussed, with particular attention to the transport of pesticide and radioactive pollutants.

849
Extensive Microbial Degradation of DDT in Vitro and DDT Metabolism by Natural Communities

Pfaender, F.K.; Alexander, M.

J. Agr. Food Chem., 20(4), 842-6; 1972

DDT; DDD; DDMS; DBP; ARTHROBACTER; CHLOROPHENYLACETIC ACID; METABOLITES; FRESHWATER; MICROFLORA; SOILS

Extracts of HYDROGENOMONAS cells converted DDT to DDD, DDMS, and DBP, and several other products under anaerobic conditions. P-Chlorophenylacetic acid was formed when whole cells and oxygen were subsequently added. A strain of arthrobacter grew on chlorophenylacetic acid, and formed p-chlorophenylglycolaldehyde and other products. The major metabolites formed by microbial communities of sewage and fresh water containing sediment were DDD and DBP, but small amounts of DDMS and 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene but no chlorophenylacetic acid accumulated. Added chlorophenylacetic acid was rapidly decomposed by the sewage microflora.

850
Retention of Emulsions After Broadcast Treatment

Phil'Menshtein, I.D.; Bezuglyi, S.F.; Nesterova, I.A.; Yaklovleva, L.I.

Khim. Sredstva Zashch. Rast.(D8MMYC), No. 1, 291-7; 1970

CHLOROPHENOXYACETATE; RUNOFF; RETENTION; PESTICIDES; EMULSION

851
Percent of Copper Diffusing in the Adsorbed and Electrolyte Solution Phases in Kaolinite and Montmorillonite

Phillips, R.E.; Barnhisel, R.I.; Ellis, J.H.; University of Kentucky, Lexington, Kentucky

Soil Sci Soc Am Proc, 36(1), 35-39; 1972

X-RAY FLUORESCENCE; DIFFUSION COEFFICIENT; COPPER; KAOLINITE; MONTMORILLONITE; ELECTROLYTE SOLUTION; ADSORPTION; SOILS; CATIONS

The apparent diffusion coefficient, de, of a cation diffusing in soil was proposed to be dem = (Dsm (dCs/dCsa) +' dam (dCa/Csa))/(1 + dCp/dCsa) where d(s)(m) and (9)D(a)(m) are the diffusion coefficients of the cation in the electrolyte-solution phase and adsorbed phase respectively. C(s), c(a) and c(p) are concentrations of electrolyte-solution cations, adsorbed cations and precipitated or immobilized cations respectivley; c(sa) was the sum of c(s) and c(a). The total diffusion in the adsorbed phase was 100, 52, 34, 22, 18, 9 and 7 at c(sa) concentrations of 0.015, 0.02, 0.03, 0.04, 0.05, 0.06 + 0.08 meq g(-1), respectively, for a kaolinite clay and 100, 57, 42, 34, 28, 20 and 13 at c(sa) concentrations of 0.03, 0.05, 0.10, 0.15, 0.20, 0.40 and 0.70 meq g(-1), respectively, for a montmorillonite clay.

852
Persistence and Movement of Picloram in 2 Kansas Soils

Phillips, W.M.; Feltner, K.C.

Weed Sci, 20(1), 110-116; 1972

GLYCINE-MAX; PHYTOTOXICITY; PERSISTENCE; MOVEMENT; PICLORAM; SOILS

853
Effects of Different Aqueous Buffers on the Zinc Extractability of Dithizone

Pietz, R.I.; Adams, R.S., Jr.; MacGregor, J.M.

Soil Sci. Soc. Amer. Proc., 34(4), 698-699; 1970

SOILS; NUTRIENTS; AVAILABILITY; ZINC; AQUATIC BUFFER; BUFFERS; DITHIZONE

854
Study of Soil Algae. Part 7. Adsorption of Herbicides in Soil and Prediction of Their Rate of Application by Algal Methods

Pillay, A.R.; Tchan, Y.T.

Plant Soil, 36(3), 571-594; 1972

WHEAT-M; DIURON; NEBURON; MONURON; ATRATONE; ATRAZINE; SIMAZINE; BIOLOGICAL-CHEMICAL WEED CONTROL; HERBICIDES; SOILS; ALGAE; ADSORPTION

855
Crop-Herbicide Relationships Considering Soil and Water Pollution

Pinthus, M.J.; Hebrew Univ. of Jerusalem

Biological Conservation, 5(4), 295; 1973, October

HERBICIDES; ACCUMULATION; WATER; IRRIGATION; CROPS; SOILS; RESIDUES; LEACHING; RAINFALL

Certain herbicides which are not readily decomposed will cause accumulation of their residues in the soil. Moreover, water-soluble herbicides can be leached, following rain or irrigation, and may contaminate the water. The restriction of the application of herbicides to those which are least inducive of soil or water pollution may be achieved through breeding of crop varieties which are resistant to these herbicides. (7 refs)

856
Pesticide Sediment Water Interactions

Pionke, H.B.; Chesters, G.; Agricultural Research Service Soil and Water Conservation Res. Div., U.S. Dept. of Agricultural, Chickasha, OK

J Environ Qual, 2(1), 29-54; 1973

VEGETATION; PERSISTENCE; RESIDUES; TRANSPORT; AIR; RUNOFF; REVIEW; AQUATIC ECOSYSTEMS; SEDIMENTS; SOILS; ATMOSPHERE; GROUNDWATER; LAKES; WATERSHEDS; PESTICIDES; SEDIMENT WATER INTERACTIONS; GROUND WATER

Pesticide-sediment-water interactions occurring within a watershed and the associated aquatic system are reviewed regarding their impact on the distribution and persistence of pesticides in recipient lakes. Pesticidal persistence on the watershed is discussed initially because the aquatic residue hazard depends largely on the persistence of soil-applied pesticides. Mechanisms of transport from field to aquatic system are reviewed for those compounds not degraded rapidly to nontoxic derivatives. Pesticides transport through the atmosphere, ground water, and surface runoff is traced with particular emphasis on application-associated losses and transport effect on initial pesticide distribution and concentration in the aquatic system. Field and plot studies evaluating pesticide losses in runoff are summarized. Within the aquatic system, limnological, sediment, and water characteristics potentially alter the distribution of adsorbed pesticide between water and associated sediment within the lake. Specifically, the effects of ph, lake stratification, characteristics and content of sediment organic matter and clay, and salinity are evaluated. This review concludes with a discussion of literature on pesticide persistence determined in simulated or natural aquatic systems and the interactions between aquatic vegetation, sediment, and water which affect pesticide distribution. (150 refs)

857
Extraction of Chlorinated Hydrocarbon Insecticides from Soils

Pionke, H.B.; Chesters, G.; Armstrong, D.E.

Agron. J., 60(3), 289-92; 1968

CHLORINATED HYDROCARBONS; INSECTICIDES; SOILS

858

Movement of Benomyl in Field Soils as Influenced by Acid Surfactants

Pitblado, R.E.; Edgington, L.V.; Dep. Environ. Biol., Univ. Guelph, Guelph, Ont.

Phytopathology(PHYTAJ), 62(5), 513-16; 1972

SURFACTANTS; BENOMYL; SOILS; FUNGICIDES; MOVEMENT; GAFAC SURFACTANTS; DEGRADATION PRODUCTS; PROTONATION; ACIDIFICATION; METHYL 2-BENZIMIDAZOLECARBAMATE

The movement of benomyl in the soil was enhanced by surface-active agents. One percent tween 20, fagac rm-710 and Gafac ra-600 increased the solubility of methyl 2-benzimidazolecarbamate, the fungicidal breakdown product of benomyl. The solubilization of Me2-benzimidazolecarbamate by surface-active agents is partially due to acidification and partially to another effect, possibly micelle formation. The gafac surfactants, which solubilized Me2-benzimidazolecarbamate to a greater extent than did Tween 20, showed a greater capacity to move the fungicide through the soil.

859

Photochemistry of Pesticides. Discussion of the Influence of some Environmental Factors

Plimmer, J.R.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md

Part of Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAay) 1972, 6, 47-76; 1972

REVIEW; PESTICIDES; PHOTODECOMPOSITION; SOILS; CLAY; PCP; PHOTOCHEMISTRY; ADSORPTION; SILICA; ABSORPTION; DDT; 2,4,5-T; DICHLOBENIL; DIOXINS; PROPHAM; CHLOROPROPHAM; PROPANIL; TRIFLURALIN; DECOMPOSITION; ABSORPTION; WAVELENGTH; SPECTRUM; LIGHT; OXYGEN; REACTIONS; CHLOROBENZOIC ACID; CHLOROBENZONITRILE; CHLOROPHENOLS; TRICHLOROPHENOLS; TETRACHLOROPHENOLS; DICHLOROANILINE; SENSITIZER MOLECULE; OXIDATION; TRANSFER

Intermolecular reactions, determined largely by environmental conditions surrounding the pesticide molecule, to a large extent direct the decomposition of pesticides on the ground surface. Solvent or surrounding molecules may participate in these reactions. A change in the energy required to trigger photodecomposition may be caused by adsorption of the pesticide molecule to the surface of silica or clay mineral, thus causing a change in the maximum molecular absorption wavelength. Spectral changes resulting from adsorption to silica have been measured in DDT derived compounds, 2,4,5-T, o-chlorobenzoic acid, 2,3,6-trichlorobenzoic acid, o-chlorobenzonitrile, dichlobenil, dioxins, propham, chloropham, 3,4-dichloroaniline, propanil, trifluralin, 4-chlorophenol, 3,4,5-trichlorophenol, 2,3,5,6-tetrachlorophenol, and PCP. Photosensitized decomposition occurs when a sensitizer molecule absorbs light energy and transfers it to a reacting species. In photosensitized oxidation singlet oxygen may be produced by interaction of a sensitizer with oxygen. Singlet oxygen can cause reactions at sites remote from those at which it is generated. Therefore, photochemical reaction is possible some distance away from the absorbing surface.

860

1,3-bis(3,4-dichlorophenyl) Triazine from Propanil in Soils

Plimmer, J.R.; Kearney, P.C.; Chisak, H.; U.S. Dep. Agric., Beltsville, MD

J. Agric. Food Chem., 18, 859-861; 1970

CATIONS; BREAKDOWN; TRACER; 1,3-BIS(3,4-DICHLOROPHENYL) TRIAZINE; CLAY; PROPANIL; SOILS; DIAZONIUM; 3,4-DICHLOROANILINE; NITRITE

In a Chikugo light clay soil, a major unknown product was isolated from ^{14}C-ring labelled propanil. Its identity was established as 1,3-bis(3,4-dichlorophenyl) triazine and it was probably formed by coupling of an intermediate diazonium cation with 3,4-dichloroaniline; soil nitrite was probably involved in the formation of the cation.

861

Photoalteration of Pesticides: Summary of Workshop

Plimmer, J.R.; Rabson, R.

Science, 180(4091), 1204-1205; 1973

DEGRADATION; MAMMALS; INSECTS; DIELDRIN; PHOTOCHEMICAL OXIDATION; PHOTOREDUCTION; PHOTODIMERIZATION; HALOGEN BOND CLEAVAGE; PHOTOCHEMICAL ALTERATIONS; PHOTOALTERATIONS

The purpose of the workshop was to evaluate the importance of photochemical alterations in pesticides and to determine the possibility of using such information for the improvement of future strategies of pesticide use. In general, photochemical degradation products are less toxic to mammals and insects than the parent compound, but there are notable exceptions like dieldrin. Few of the reactions are documented, and residue monitoring systems do not detect their products. Volatility, type of application, soil characteristics, and other factors influence the exposure of pesticides to light. Photochemical oxidation, including the reaction of free radicals with oxygen to give a peroxy radical, is an important aspect of the phenomen. Photoreduction, photodimerization, halogen bond cleavage, and enhancement of pehnol acidity may also be significant in the natural environment. Research in the area of photochemical alteration appears to be decreasing although much more must be known before standardized estimation and prediction of photoalteration can be formualted.

862

Accumulation and Distribution of Mercury in Dutch Soils

Poelstra, P.; Frissel, M.J.; van der Klugt, N.; Bannink, D.W.; Inst. At. Sci. Agric., Assoc. Euratom, Wageningen, Neth.

Neth. J. Agr. Sci.(NETHAW), 21(1), 77-84; 1973

MERCURY; SOILS; PASTURES; ACCUMULATION; DISTRIBUTION; CROPS; ORGANOMETALLICS; PESTICIDES; PLANTS; REVIEW

Gives results of mercury contents survey for different types of soil in Holland. Good reference source for behaviour of mercury in the ground.

863
Behavior of Mercury Compounds in Soils: Accumulation and Evaporation

Poelstra, P.; Frissell, M.J.; Van der Klugt, N.; Tap, W.; Association Euratom-ITAL, Institute for Atomic Sciences in Agriculture, Wageningen, the Netherlands

Part of FAO/ IAEA/WHO Symposium on Comparative Aspects of Food and Environmental Contamination, Held at Helsinki, Finland, 1973, SA/175/46, 5p.; 1973

MERCURY; SOILS; FUNGICIDES; ATOMIC ABSORPTION SPECTROPHOTOMETRY; NEUTRON ACTIVATION ANALYSIS; MERCURY 203; METHYLMERCURY; DIMETHYLMERCURY; MERCURY CHLORIDE

The background mercury concentration in the top 20 centimeters of 10 uncontaminated European soils was 0.02 to 0.10 ppm (average 0.07); the concentration was lower in the 20-100 cm. depth. In the bulb growing area (where mercury fungicides had been used for many years) the concentration was about twice as high over the whole ploughing depth. The rate of accumulation is low; the rate of leaching is low, as is the rate of volatilization. Still higher values (up to 10 ppm) are found in areas flooded by the heavily polluted Rhine river. In some areas reclaimed 50 years ago, the soil was evidently contaminated then and still is. Evidently, there is some mercury being deposited with rain in almost all areas: this comes from fossil fuels, smelters, etc. and is higher near industrialized areas. Experiments showed that dimethyl mercury evaporated quickly from soils; mercury as the chloride hardly at all and as CH3 Hg Cl or mercury metal very slowly (1/2 to 1 percent in about 6 months from the experimental soil columns kept at 20 degrees C). Continuous or interrupted leaching may have affected the volalization slightly; the former increasing it for CH3HgCl and decreasing it for metallic mercury.

864
Effect of Aldrin, Dieldrin, and Heptachlor Compounds on the Absorption and Translocation of BHC and DDT Insecticides from the Soil into Maize Plants

Polizu, A.; Rom.

An. Inst. Cercet. Prot. Plant., Acad. Stiinte Agr. Silvice(APSVBN), 8, 257-63, 1970; 1972

ORGANOCHLORINE INSECTICIDES; PLANTS; BHC; DDT; CORN; ALDRIN; DIELDRIN; HEPTACHLOR; ABSORPTION; TRANSLOCATION; SOILS

865
Aldrin, Dieldrin, and Heptachlor Persistence in Soil and Accumulation of Residues in Potato Tubers Following Soil Applications

Polizu, A.; Roman, M.; Boguleanu, G.; Rome, Italy

An. Inst. Cercet. Prot. Plant., Acad. Stiinte Agr. Silvice(APSVBN) Rome, Italy 1970, 8, 271-81; 1972

INSECTICIDES; RESIDUES; SOILS; POTATOES; ALDRIN; DIELDRIN; HEPTACHLOR; DUSTING; ACCUMULATION; EPOXIDE; TRANSFORMATION; PERSISTENCE

When potato fields were dusted with 4-18kg aldrin, 2-6 kg dieldrin or 1.25-2.5 kg heptachlor/ha, the residues in the tubers exceeded for 3 years the maximum permissible concentration of 0.1 ppm. The residue accumulation by the tubers decreased in the following order: aldrin, dieldrin and heptachlor. In both soil and tubers, aldrin was converted into its epoxide to a higher degree than was heptachlor. In the soil, residues were still present in small amounts at 30 months after the treatments.

866
Soil Persistence of Fungicides--Experimental Design, Sampling, Chemical Analysis, and Statistical Evaluation

Polzin, W.J.; Brown, I.F.; Manthey, J.A.; Agric. Res., Eli Lilly & Co., Greenfield, Indiana

Pestic. Monit. J., 4, 209-215; 1971

PARINOL; CHLOROPHENYL-PYRIDINEMETHANOL; DEGRADATION; SOILS; PERSISTENCE; FUNGICIDES; STATISTICS; ANALYSIS

The design and technique used to determine the persistence of parinol, alpha, alpha-bis (p-chlorophenyl)-3-pyridinemethanol were more than adequate; this compound degraded to less than 10% of the total applied within less than a year.

867
The Effects of Trace Metals on Ground Water Quality as Influenced by Soils Reflecting Differences in Organic Matter Content and Genetic Conditions

Ponder, F.; Tuskegee Inst., Ala.

Thesis, Tuskegee Institute, Alabama; Monitoring Agency Rept. No. W74-02211, OWRR-B-028-ALA(4); Proj. OWRR-B-028-ALA; 69 p.; 1971, May

TRACE METALS; GROUNDWATER; SOILS; GENETICS; ZINC; ABSORPTION; LEACHING; RUN OFF; WATER; DIVALENT; GROUND WATER

A review of literature on the correlation between organic matter and zinc content of soil and an investigation of zinc absorption using four different types of soil. These soils, which were selected to represent a wide range of organic matter contents and genetic conditions, were prepared and submitted to studies of zinc adsorption and leaching. Soil and run-off water were analyzed for zinc content. It is concluded that organic matter is mainly responsible for the retention of zinc or other divalent metal by forming stable complexes. Groundwater having passed through soils high rather than low in organic matter will contain lesser quantities of divalent cations.

868
Effect of Solar Radiation on the Decomposition of Herbicides on the Soil Surface and on their Phytotoxicity

Popov, N.T.; Ladonin, V.F.

Tr. Vses. Nauch.-Issled. Inst. Udobr. Agropochvoved.(TVUAAG), No. 51, 220-4; 1971

HERBICIDES; PHYTOTOXICITY; LIGHT; PROPAZINE; DIURON; PYRAMIN

The herbicides propazine diuron, and pyramin loss some of their phytotoxicity toward oat plants when applied to sunlit soil at 2, 5, and 5 kg/ha, respectively, 65 days before the oats were planted. Corn and pea plants were more sensitive to the phytotoxicity of these herbicides when they were grown in full sunlight than when they they were grown in the shade. The herbicides suppressed peroxidase activity in the leaves of the plant to a greater extent in lgiht than in shade. Since it is known that peroxidase is involved in plant resistant to herbicides, this loss is enzyme activity may explain the plant senstivity to herbicides in light.

869
A New Physical Theory of the Mode of Action of DDT

Pradhan, S.; Rangarao, P.V.

Experimental, 22(9), 619; 1966

THEORY; DDT

870
Respiratory Effects and The Decomposition of Some Pesticides in Soil

Pramer, D.; Bartha, R.

Part of Primavesi, A.(Ed.), Progress in Soil Biodynamics and Soil Productivity, Pallotti, Santa Maria, Brazil, 1968 Rutgers University, New Jersey (p. 29-33); 1968

PESTICIDES; PRODUCTION; CHLORINATED HYDROCARBONS; RESPIRATION; NITRIFICATION; CARBAMATES; CYCLODIENES; PHENYLUREA; THIOLOARBAMATE; AMIDES; ANILIDES; ORGANOPHOSPHATES; PHENYLCARBAMATES; TRIAZINE; PROPIONANILIDE; 3,4-DICHLOROANILINE; TETRACHLOROASOBENZENE; HERBICIDES; SOILS; PERSISTENCE; TRANSFORMATION; DECOMPOSITION

The influence of 30 pesticides on CO2 production and nitrification by soil microorganisms was determined. A few compounds were stable but without significant effect in soil (chlorinated hydrocarbons), some persisted and depressed respiration and nitrification (carbamates, cycliodienes, phenylureas, thiolcarbamates), and others displayed toxicity but were transformed by soil micro-organisms (amides, anilides, organophosphates, phenylcarbamates, trizaines). Some compounds of the last type induced an initial increase and subsequent decrease in CO2 production by soil. The herbicide 3', 4'-dichloropropionanilide decomposed in soil to CO2 and 3,4-dichloroaniline, and two molecules of the latter compound condensed to form 3,3', 4, 4'-tetrachloroasobenzene. Soil microorganisms were involved in both transformations.

871
The Distribution and Nature of Arsenic in Soils of the Bathurst, New Brunswick, District

Presant, E.W.; Tupper, W.M.

Econ. Geol, 61, 1760-767; 1966

DISTRIBUTION; ARSENIC; SOILS

872
Use of Herbicides on Carrot Crops on Peat Soils

Proskura, M.S.; Ukr. Nauk. Dosl. Inst. Zemlerobstva, Kiev, USSR

Visn. Sil's'kogospod. Nauki (VSNAAG), 6, 70-75; 1973

HERBICIDES; WEEDS; CARROTS; PROPAZINE; PROMETRYNE; TRICHLOROACETATE; LINURON; ALIPUR; PEAT; SOILS

873
Effect of an Organo Mercury Fungicide on Saprophytic Fungi and on Litter Decomposition

Pugh, G.J.F.; Williams, J.I.

Trans. Br. Mycol. Soc., 57(1), 164-166; 1971

GRASS; SOILS; MERCURY; FUNGICIDES; FUNGI; DECOMPOSITION

874
Arsenite Oxidation in Soil

Quastel, J.H.; Scholefield, P.G.

Soil Science, 75, 279-285; 1953

ARSENITE; MICROORGANISMS; SOILS; ADSORPTION; SODIUM ARSENATE; ARSENIC

Arsenite undergoes biological oxidation to arsenate in soil. On repeated perfusion of a soil with arsenite, conditions are obtained under which arsenite is oxidized at a constant rate. Addition of sodium azide to soil eliminates the oxidation of arsenite. The presence of sulfanilamide also inhibits arsenite oxidation in soil, but adaptation rapidly occurs. Arsenate per se has no deleterious effect on arsenite oxidation. Arsenite is adsorbed by soil, the extend of adsorption at pH 7 being directly proportional to the concentration of arsenite. A small but constant amount of arsenite is apparently bound irreversibly to the soil. The final rates of arsenite oxidation by soils repeatedly perfused with arsenite depend on the pH of the perfusate and the concentration of arsenite. After many perfusions of sodium arsenite at pH 7 the oxidizing ability of an enriched soil decreases. Soils enriched with arsenite-oxidizing organisms are capable of enrichment also with nitrifying organisms. These organisms apparently develop at separate sites on the soil surfaces. This accounts for the fact that repeated alternate perfusions with ammonium ions and with sodium arsenite result in rates of nitrification and arsenite oxidation almost identical with those of soils exposed to either substrate alone. The extents of oxygen uptake of enriched soils in the presence of sodium arsenite were measured manometrically; the amounts were those predicted for oxidation to arsenate.

875
Arsenite Oxidation in Soil

Questel, J.H.; Scholefield, P.G.

Soil Sci., 75, 279-295; 1952

ARSENITE; OXIDATION; SOILS

876
Photoalteration of Pesticides: Summary of Workshop

Rabson, R.; Plimmer, J.R.; Biol. Branch, Div. Biomed. Environ. Res., U. S. Atomic Energy Comm., Washington, DC 20545

Science, 180(4091), 1204-1205; 1973

REACTION PRODUCTS; SOILS; REVIEW; PHOTOCHEMICAL ALTERATIONOIC; DEGRADATION; MAMMALS; INSECTS; DIELDRIN; RESIDUES; VOLATILITY; OXIDATION; PHOTOREDUCTION; PHOTODIMERIZATION; HALOGEN BOND CLEAVAGE; PHOTOALTERATIONS; PESTICIDES

A workshop was held at the National Academy of Science, Washington, DC, April 6-8, 1972, by the U.S. Atomic Energy Commission and the U.S.D.A. to evaluate the importance of photochemical alterations in pesticides and to determine the possibility of using such information for the improvement of future strategies of pesticide use. In general, photochemical degradation products are less toxic to mammals and insects than the parent compound, but there are notable exceptiions like dieldrin. Few of the reactions are documented, and residue monitoring systems do not detect their products. Volatility, type of application, soil characteristics, and other factors influence the exposure of pesticides to light. Photochemical oxidation, including the reaction of free radicals with oxygen to give a peroxy radical, is an important aspect of the phenomenon. Photoreduction, photodimerization, halogen bond cleavage, and enhancement of phenol acidity may also be significant in the natural environment. Research in the area of photochemical alteration appears to be decreasing although much more must be known before standardized estimation and prediction of photoalterations can be formulated.

877
Residues in Soils and Strawberries-D Resulting from Simazine Applications

Ragab, M.T.H.; Leefe, J.S.

Can J Plant Sci, 52(2), 147-149; 1972

HERBICIDES; WEEDS; RESIDUES; SOILS; STRAWBERRIES; SIMAZINE

878
Persistence of Trifluralin Under Field Conditions in Saskatchewan

Rahman, A.; Ashford, R.; Crop Sci. Dep., Univ. Saskatchewan, Saskatoon, Saskatchewan, Canada

Can. J. Plant Sci.(CPLSAY), 53(2) 421-3; 1973

TRIFLURALIN; SOILS; RESIDUES; HERBICIDES; PERSISTENCE; MILLET; WHEAT; FIELD APPLICATION

When 1.12 or 2.24 kg trifluralin/ha was applied in the field, the soil contained sufficient trifluralin to produce a phytotoxic effect on german millet (SETARIA ITALICA) after one growing season. A rapid decline in the amount of trifluralin residue occurred during the first 2 months of the second growing season. The presence of wheat (TRITICUM AESTIVUM) crop had no effect on the persistence of trifluralin in the soil.

879
Soil Degradation of Two Phenyl Pyridazinone Herbicides

Rahn, P.R.; Zimdahl, R.L.; Dep. Bot. Plant Pathol., Colorado State Univ., Fort Collins, Colo.

Weed Sci.(WEESA6), 21(4), 314-17; 1973

PYRIDAZINONE; HERBICIDES; SOILS; SAN 6706; DEGRADATION

880
Residues of Atrazine and Simazine, and of Their Metabolites, in Soil after Long-Continued Application

Ramsteiner, K.A.; Hormann, W.D. O.; Eberle, D.; Cita-Geigy, Basel, Switzerland

Sonderheft Zeitschrift fur Pflanzenlerankheiten (Plfanzenpathologie) und Pflanzenschutz, 6, 43-52; 1972

RESIDUES; SOILS; LOAM; SAND; METABOLITES; HERBICIDES; SIMAZINE; ATRAZINE

Residues and metabolites of the s-triazine herbicides were determined in sandy loams after annual applications of 6 kg/ha simazine or 10 kg atrazine over periods of 10-13 years.

881
Biodegradation of Malathion

Randall, C.W.; Lauderdale, R.A.

Jour. San. Eng. Div., Proc. Amer. Soc. Civil Eng., 93(SA6), 145; 1967

BIODEGRADATION; DEGRADATION; MALATHION; PESTICIDES

882
The Arsenic Content in Soil Following Repeated Applications of Granular Paris Green

Rathburn, C.B.

Mosquito News, 26(4), 537-39; 1966

ARSENIC; GRANULAR PARIS GREEN; SOILS; PESTICIDES

883
Residue and Action of Benomyl on Fungi in Soil

Raynal, G.; Ferrari, F.; Inst. Natl. Agron. Paris Grignon, Thiverval-Grigon, France

Phytiat.-Phytopharm. (PHPHA6), 22(3), 259-72; 1973

BENOMYL; SOILS; FUNGI; RESIDUES; BIOASSAY

As shown by a bioassay using PENICILLIUM CYCLOPIUM, 100 ppm benomyl applied to the soil in the laboratory left a 8 ppm residue after 6 months. Benomyl was fungistatic, rather than fungicidal. At 10 and 100 ppm, only the PHYCOMYCETES, STILBELLACEAE, and several Alternaria species were resistant to benomyl.

884
Bioassays on the Activation and Deactivation of some New Insecticides in a Mineral Soil and Absorption of Toxic Components by Rutabagas

Read, D.C.; Res. Stn., Canada Agric., Charlottetown, Prince Edward Island

J. Econ. Entomol.(JEENAI), 64(4), 796-800; 1971

INSECTICIDES; CABBAGE MAGGOTS; RUTABAGAS; PHOSPHOROTHIOATE; PHOSPHONOTHIOATE; CARBOFURAN; PHORATE; THIONAZIN

Bioassays with first larval stages of the cabbage maggot (HYLEMYA BRASSICAE) showed that subsurface soil application of phorate and thionazin were highly toxic soon after application but decreased in toxicity during the growing season. Carbofuran became biologically active soon after application and was the most toxic of the compounds tested, and toxic components persisted longer than those of thionazin or phorate at a given rate of toxicant/acre. Chlorfenvinphos, fonofos, and trichloronat, were the most slowly activated and the most persistent of the compounds tested. Fonofos and trichloronat showed no signs of phytotoxicity even at exceedingly high rates, whereas all other compounds, as well as fensulfothion and diazinon, were toxic to rutabagas at rates above 20 lb. toxicant/acre. Carbofuran was the only compound that showed readily detectable upward movement in the soil and toxicants of this material killed flies resting on the soil surface. Absorption of toxic components of the insecticides by rutabagas grown in the treated soil was highest for fensulfothion followed in order by trichloronat, chlorfenvinphos, fonofos, carbofuran, thionazin, and phorate. Toxic residues of phorate and thiomazine were detected in the roots only at high rates/acre, and the toxicants of these materials and of carbofuran and fensulfothion decreased after 80-90 days. The components decreased rapidly in the roots during storage. Toxic metabolites of carbofuran and chlorfenvinphos decreased slowly in storage and were hardly detectable after 3-4 months. Toxic residues of trichloronat did not decrease in stored rutabagas for at least 4 months.

885
Bioactivity and Persistence of Some New Insecticides in a Mineral Soil

Read, D.C.; Res. Stn., Canada Agric., Charlottetown, Prince Edward Island

J. Econ. Entomol.(JEENAI), 64(4), 800-4; 1971

INSECTICIDES; BIOACTIVITY; PERSISTENCE; SOILS; PHOSPHONOTHIOATE; PHOSPHOROTHIOATE

Bioactivity of granular formulations of 12 candidate or registered insecticides banded 3/4 in. deep in a mineral soils was determined in microplot field tests. Samples were collected at intervals and bioassayed with larvae of the cabbage maggot (HYLEMYA BRASSICA). Some materials, as propoxur and zinophos, were most bioactive within 3 days after application in the soil, and bioactivity decreased to nondetectable levels in 1 to 3 months. Other compounds, such as Bay 37289, chlorfenvinphos, and dyfonate, except for some initial toxicity, were slowly bioactivated, with toxicity increasing during the growing season; toxicants present in the fall persisted at a relatively constant level throughout the witner and spring. Carbofuran and dasanit were the most toxic to test organisms 30 days after soil application. Toxicity gradually decline thereafter, and toxic residues were barely detectabel the following spring.

886
The Movement and Impact of Pesticides Used in Forest Management on the Aquatic Environment and Ecosystem.

Reese, C.D.; Becker, D.L.; Cornell Aeronautical Lab., Inc., Buffalo, NY

Vol. 1. Pesticide Studies Series 7, July 19, 1971-January 15, 1972; Report No. CAL-EC-5025-D-2-Vol-1; Contract EPA-68-01-0125; Monitoring Agency Rept. No. EPA-OWP-TS-00-72-07, EPA-CWP-PSS-7; 1; PB-217 990; 325 p.; 1972, June

SEVIN; GYPSY MOTH; PESTICIDES; PEST CONTROL; WATER; DDT; HYDROLOGY; LEACHING; AQUATIC ECOSYSTEMS; FORESTS; FATE; MOVEMENT

The report summarizes the findings, conclusions, and recommendations relative to the use of pesticides in the forested regions of New York State, and the resultant impact on the aquatic environment. It is organized on a chronological basis. The scope of this study starts with an historical sketch on the use-development of pesticides in New York State forest management and concludes with indications as to the potential role of pesticides in the future. The fate of pesticides and their impact on the aquatic environment is chronologically summarized by consecutive presentation of what is applied, how is it applied, how it moves from the forest to the aquatic environment and finally, the manifestations of the pesticide within the aquatic environment.

887
The Movement and Impact of Pesticides Used for Vector Control on the Aquatic Environment in the Northeastern United States.

Reese, C.D.; Becker, D.L.; Little (Arthur D.), Inc., Cambridge, MA

Pesticide Study Series 9; Contract DI-68-01-0129; Monitoring Agency Rept. No. EPA-OWP-TS-00-72-05; 9; PB-217 843/2; 234 p.; 1972, July

SALT MARSHES; PERSISTENCE; METHOXYCHLOR; WATER; ANIMALS; RESIDUES; INSECTICIDES; PESTICIDES; CULICIDAE; INSECTS; SWAMPS; DDT; DIELDRIN; MALATHION; PYRETHRUM; BIOCIDES; LARVAE; MINERAL OILS; AQUATIC ESTUARIES; BIODETERIORATION; METABOLISM; DISEASE VECTORS; MOSQUITOES; ABATEMENT; STAGNANT WATER; DRAINAGE; AQUATIC ECOSYSTEMS

In the Northeastern United States the mosquito abatement programs are conducted for the vector control of eastern equine encephalitis, to reduce the nuisance problem caused by mosquitoes, and to enhance recreation areas. Typically, these programs consist of the application of pesticides (Vectoricides) and the drainage of stagnant water. The report summarizes a case study of a specific vectoricide use situation documenting the kinds and quantities used, their route from the point of initial application into the water environment, their ultimate effect on the ecosystem, and the laws and regulations which affect their use. Cape Cod was chosen for the study area.

888
On the Residue Dynamics of the Products Tirzilin, Trakephon and Bercema-CCC in the Soil

Reifenstein, H.; Czyrnia, W.; Beitz, H.; Biol. Landesanstalt Berlin der Akad. der Landwirtschaftswiss. der DDR, Inst. fuer Pflanzenschutzforschung Kleinmachnow, Kleinmachnow, DDR

Nachrichtenbl. Pflanzenschutzdienst DDR, 27(10), 204-207; 1973

RESIDUES; TRIZILIN; TRAKEPHON; LOESS; SOILS; MODEL EXPERIMENTS; DIPHENYL ETHER; HALF-LIFE; DECOMPOSITION; SAND; COMPOST

The residue dynamics of 2,4-dichloro-4' nitrodiphenyl ether (active agent of trizilin), 1-butylaminocyclohexane phosphonic acid dibutyl ester (active agent of trakephon), and of chlormequat chloride (bercema-CCC) in loess, sandy, and compost soils were studied in model experiments. Diphenyl ether proved to be highly persistent over several months in all types of soils tested. An initial concentration of 4-5 ppm fell to 2.8-3.6 ppm in 107 days. Trakephon had a half-life of 8 to 11 days. No residues of chlormequat were detected in loess soils 28 days after introduction. Only slight penetration was found for diphenyl ether and trakephon. Although chlormequat is highly water-soluble, it is not considered to be a potential groundwater contaminant on account of its rapid decomposition.

889
A Hierarchy of Models for the Behavior of Mercury in the Ecosystem

Reiniger, P.; Frissel, M.J.; Poelstra, P.; Beek, B.

Part of Welsh, C.N. (Ed.), International Atomic Energy Agency Proceedings Series. Nuclear Techniques in Environmental Pollution, Symposium, Uniput, Inc., New York, NY, (p. 407-414) 810 p.; 1971

CHROMATOGRAPHY; TRANSPORT; SOILS; RADIOACTIVITY; POLEIS; MERCURY; MODEL ECOSYSTEM

890
Pesticides in the Soil from the Cauliflower District in Vintrie Skane

Renvall, S.; Lindskog, E.

Vaxtskyddsnotiser, 36(3-4), 48-51; 1972

ALDRIN; DIELDRIN; DDT; DDE; LINDANE; PERSISTENCE; PESTICIDES; SOILS

891
Fate of Carbon-14-labeled Chloroneb in Plants and Soils

Rhodes, R.C.; Pease, H.L.; Brantley, R.K.; Ind. Biochem. Dep., E. I. Du Pont De Nemours And Co., Inc., Wilmington, Del.

J. Agr. Food Chem(JAFCAU), 19(4), 745-9; 1971

CHLORONEB; FUNGICIDES; METABOLISM; PLANTS; SOILS; METABOLITES; QUINONES

Chloroneb uptake by cotton and bean plants was demonstrated, the fungicide being primarily concentrated in the roots and lower stem portions of the plants. Chloroneb and its principal metabolite, 2,5-dichloro-4-methoxyphenol accounted for 95% of the residues extracted from treated plants, appearing in a 1:1 ratio. Small amounts of 2,5-dichloroquinone and 2,5-dichlorohydroquinone were also detected. The half-life of chloroneb-14C in soil was greater than 3-6 months when incorporated into the soil 2-3 in. below the surface at a rate of 2 lb/acre. About 90% of the residual activity recovered from treated soil was intact chloroneb.

892
Retention of 3 Insecticides on Different Size Soil Particles Suspended in Water

Richardson, E.M.; Epstein, E.

Soil Sci Soc Am Proc, 35(6), 884-887; 1971

DDT; METHOXYCHLOR; ENDOSULFAN; PESTICIDES; RESIDUES; ORGANIC MATTER; PARTICLE SIZE; RETENTION; INSECTICIDES; SOIL PARTICLES

Retention of DDT and methoxychlor was greatest in the less than 0.08 micrometer and 0.5-0.08 micrometer fractions of both the B horizon of a silt loam (pH 6.5, CEC 13.5, organic matter 0.9%) and the A horizon of a second silt loam (pH 5.5, CEC 24.4, organic matter 3.3%). Endosulfan retention was also greatest in the fine clay fractions of the B horizon samples but in the A horizon samples endosulfan retention was greatest in the sand fraction (2000-50 micrometer). Retention DDT and methoxychlor by the fine clay fractions and of endosulfan by all clay fractions of the B horizon samples was greatly reduced by organic matter removal with H_2O_2 treatment. The retention of DDT and methoxychlor was slightly increased in the 0.5-1 and 1-2 micrometer clay fractions by organic matter removal. H_2O_2 treatment decreased retention of all 3 insecticides by the A horizon samples except for the retention of DDT by the 0.5-1 and 1-2 micrometer fractions which was increased.

893
The Movement of DDT in Forest Soil Solutions

Riekerk, H.; Gessel, S.P.

Soil Sci. Soc. Am. Proc., 32(4), 595-6; 1968

MOVEMENT; FOREST SOILS; DDT; SOILS

894
Atrazine, Propachlor, and Diazinon Residues on Small Agricultural Watersheds. Runoff Losses, Persistence, and Movement

Ritter, W.F.; Iowa State Univ., Ames, Iowa

Env. Science & Technology, 8(1), 38-42; 1974, January

ATRAZINE; PROPACHLOR; DIAZINON; WATERSHEDS; RUNOFF; PERSISTENCE; MOVEMENT; RESIDUES; DEGRADATION; PESTICIDES; SEDIMENTS; SOILS; LOESS; CORN

Atrazine (2-chloro-4-ethylamino-6-isopropylamino-s-triazine), propachlor (2-chloro-N-isopropylacetanilide), and diazinon (O,O-diethyl O-(2-isopropyl-6-methyl-4-pyrimidinyl) phosphorothioate) losses in sediment and surface runoff were measured from four watersheds ranging in size from 1.9-3.8 acres and located in the loessial soil region of western Iowa. Two of the watersheds were planted to ridged corn, and two were planted to surface-contoured corn. Movement of atrazine, propachlor, and diazinon in the soil profile and degradation of these pesticides were measured. Pesticide losses were much greater from the surface-contoured watersheds than the ridged watershed. Significant amounts of surface-applied atrazine and propachlor were removed from the surface-contoured watersheds by storms occurring shortly after the pesticides were applied. Insignificant amounts of diazinon were removed in the surface runoff and sediment. Generally, pesticide concentrations were higher in the sediment than in the runoff water; however, greater total losses were associated with the greater volume of water.

895
Environmental Factors Affecting the Movement of Atrazine, Propachlor, and Diazinon in Ida Silt Loam

Ritter, W.F.; Iowa State Univ., Ames, Iowa

Thesis, Iowa State University, Ames, Iowa (238p.); 1971

ATRAZINE; SOILS; PROPACHLOR; DIAZINON; MOVEMENT; SILT; LOAM

896
Diffusion of Atrazine, Propachlor, and Diazinon in a Silt Loam Soil

Ritter, W.F.; Johnson, H.P.; Lovely, W.G.; Dep. Agric. Eng., Univ. Delaware, Newark, De

Weed Sci.(WEESA6), 21(5), 381-4; 1973

PESTICIDES; DIFFUSION; SOILS; DIAZINON; ATRAZINE; PROPACHLOR; SILT LOAM; SILT; LOAM; TEMPERATURE; WATER; BULK DENSITY; MOISTURE; DIFFUSION COEFFICIENT; MOVEMENT; DENSITY

The effect of soil temperature, soil moisture content, and soil bulk density on the diffusion of diazinon, atrazine and propachlor in silt loam soil was studied in the laboratory. The diffusion coefficients for propachlor, atrazine, and diazinon were 1.90, 1.36, and 0.63 mm^2/day, respectively, at 27 degrees. The greatest amount of movement occurred at high temperatures and moisture contents. Soil moisture had the least effect on diazinon movement, a somewhat greater effect on propachlor movement, and the greatest effect on atrazine movement. The movement of all 3 pesticides decreased with an increase in the soil bulk density.

897

Herbicides for Flue-cured Tobacco. 2. Soil Persistence

Rodriguez, E.B.; Worsham, A.D.; Market Dev., Monsanto Venezuela C.A., Apartado Postal 6477, Caracas 101, Venezuela

Tob. Sci., 17, 170-174; 1973

TOBACCO; BENEFIN; ISOPROPALIN; PEBULATE; R-7465; HERBICIDES; DISSIPATION; OATS; WHEAT; SOILS; PERSISTENCE

Bioassays of soil from tobacco fields treated with R-7465, benefin, isopropalin, or pebulate showed R-7465 to be the most persistent with 80, 48, and 42% of 1.0, 2.0 and 4.0 lb/acre applied remaining after 20 weeks. When incorporation was pre-bed with the disk as compared to post-bed incorporation with a power-driven rotary hoe, a greater concentration of all herbicides was found in the 3-to 6-inch soil layer than in the 0-3-inch depth. Dissipation of benefin and isopropalin did not vary significantly with method of incorporation, but disk-incorporated pebulate disappeared more slowly at the 3- to 6-inch depth. Oats and wheat planted after tobacco harvest were not injured in the benefin, isopropalin, or pebulate-treated plots, but were almostly completely killed by residues in plots treated at 4 lb/acre R-7465. (19 references)

898

Degradation of Carbaryl by Soil Microorganisms

Rodriguez, L.D.; Univ. Kentucky, Lexington, KY

Thesis, University of Kentucky, Lexington, Kentucky; Univ. Microfilms, Ann Arbor, Mich., Order No. 73-29, 908; 1973

CARBARYL; SOILS; MICROORGANISMS; INSECTICIDES; DEGRADATION

899

The Effect of Arsenic Trioxide on the Growth of White Spruce Seedlings

Rosehart, R.G; Lee, J.Y.

Water Air Soil Pollut, 2(4), 439-443; 1973

GROWTH; RETARDATION; SOILS; ARSENIC TRIOXIDE; TREES; SPRUCE; SEEDLINGS

900

Arsenic Fixation in Relation to the Sterilization of Soils with Sodium Arsenite

Rosenfels, R.S.; Crafts, A.S.

Hilgardia, 12(3), 203-229; 1939

ARSENICS FIXATION; STERILIZATION; SOILS; SODIUM ARSENITE

901

Degradation of 4 Phenyl Urea Herbicides by Mixed Populations of Microorganisms for 2 Soil Types

Ross, J.A.; Tweedy, B.G.

Soil Biol. Biochem., 5(6), 739-746; 1973

FLUOMETURON; CHLOROXURON; METOBROMURON; CHLORBROMURON; DEMETHOXYLATION; ANILINE; HYDROLYSIS; METABOLISM; SOILS; DEGRADATION; PHENYL UREA; HERBICIDES; MICROORGANISMS

902

Malonic Acid Conjugation by Soil Microorganisms of a Pesticide-Derived Aniline Moiety

Ross, J.A.; Tweedy, B.G.; Univ. of Missouri, Dept. of Plant Pathology, Columbia, MO 65201

Bulletin of Environmental Contamination and Toxicology, 10(4), 234-236; 1973, October

ACARICIDES; AMINES; BIODEGRADATION; ANILINE MOIETY; MICROORGANISMS; MICROBIAL ACTIVITY; SOILS; CHLORDIMEFORM; MALINIC ACID; PESTICIDES

The conversion of the aniline moiety of the acaride chloridmeform to its malonanilic acid derivative is described. Mixed population cultures of soil microorganisms were prepared by suspending 0.5 g of soil in 50 ml of synthetic medium containing 25 microgram/ml of chlordimeform. After incubation and treatment, samples were analyzed. In the soil cultures, 70% of the parent compound decomposed. A major, previously unreported metabolite which was not present in the controls was found in each inoculated culture, predominantly in the acidic, nonaqueous fractions. The compound was isolated, purified, and a mass spectral analysis made. Conjugation of the aniline moieties of pesticides with malonic acid may be a significant transformation in the soil.

903

Movement and Accumulation of Mercury in Apple Trees and Soil

Ross, R.G.; Stewart, D.K.R.

Canada J. Plant Sci., 42, 280-285; 1962

MOVEMENT; ACCUMULATION; MERCURY; APPLE TREES; APPLE ORCHARDS; SPRAYS; PHENYLMERCURIC ACETATE; RESIDUES; FOLIAGE; FRUITS; LEAVES; TRANSLOCATION; UPTAKE; ROOTS; SOILS; PERSISTENCE; APPLES; TREES

In a mature apple orchard which received 21 pre-cover sprays of phenylmercury acetate in five years and 9 sprays in two years, residues of 1.11 and 0.5 ppm mercury occurred almost entirely in the top two inches of soil. The mercury moved from the foliage to growing fruit and new leaves by translocation, but there was no uptake through the roots.

904
Nature and Effect of Environmental Pollution Substances in Composts of Refuse Sewage Sludge. 2. Reduction of the Herbicide Simazine During the Process of the Decomposition

Roszinski, H.; Herzel, F.; Inst. Kulturtech. Gruenlandwirtsch. Fachbereich, Tech. Univ. Berlin, Berlin, Germany

Z. Kulturtech. Flurbereinig. (ZKUFAK), 13(5), 304-10; 1972

REFUSE; SEWAGE; SLUDGE; DEGRADATION; SIMAZINE; DECOMPOSITION; COMPOST; BREAKDOWN; HERBICIDES

The degradation of simazine during the post-composting of a fresh compost and another mature compost was studied by systematic sample analyses using gas chromatography and temperature measurements. By comparing the temperature curves and the simazine decomposition curves, a definite decrease in the simazine concentration in the composts as a function of the post-composting intensity was established. The rate of simazine decomposition, like the post-composting activity, was highest during the initial period of the post-composting process in both types of composts. Since the rotting intensity in fresh compost was both higher and more prolonged than in the mature compost, the diminution of the simazine concentration in the former was first more rapid and more persistent than in the mature compost pit. As the decomposition activity of the composts decreased, the simazine breakdown curves flatened distinctly. The simazine concentrations fell from about 50 ppm to over 10 ppm in 95 days in fresh compost and in 55 days in mature compost. The observed decrease in the simazine concentration in the composts does not justify the use of simazine for weed control in areas from which wastes may get into composts.

905
Degradation of Pesticides in Agricultural Land

Botini, O.T.; Levi-Minzi, R.; University of Pisa, Italy

Notiz Mal Piante (82-83). 1970 9-36.

DEGRADATION; SOILS; PESTICIDES; EQUILIBRIUM; PERSISTENCE; ALDRIN; DIELDRIN; DDT; MINERALIZATION; FIXATION; AMMONIFICATION; NITRIFICATION; DECOMPOSITION; UREA; REVIEW; NITROGEN CYCLE

Interrelationships between pesticides and productivity, biological equilibrium and soil properties are reviewed, and the persistence of chemicals (DDT, aldrin, dieldrin, etc.) in soil and their effect on the N cycle (mineralization and fixation, ammonification and nitrification) as well as on the decomposition of CaCN2 and urea are discussed. (52 references)

906
Decomposition of Synthetic Compounds by Microorganisms. Literature Review

Ruban, E.L.; Inst. Microbiol., Moscow, Ussr

Izv. Akad. Nauk Sssr, Ser. Biol.(IANBAM), (3), 301-12; 1973

REVIEW; SOILS; MICROBES; PESTICIDES; HERBICIDES; MICROORGANISMS; INSECTICIDES; METABOLISM; ATRAZINE; CARBARYL; RESIDUES; DECOMPOSITION

A review on the effects of herbicides, such as atrazine, and insecticides, such as carbaryl, on the soil microorganisms and the metabolic decomposition of pesticide residues in the soil by these microbes. (63 references)

907
Effects of Some Pesticides on the Solubility of Nutrients in Submerged Soil

Russo, S.

Riso (Milan), 19(1), 37-54; 1970

MICROORGANISMS; PESTICIDES; SOILS; SOLUBILITY; NUTRIENTS

908
Developing a Soil Quality Index

Rust, R.H.; Adams, R.S.; Martin, W.P.

Part of Thomas, Williams A. (Ed.). Indicators of Environmental Quality. Proceedings of a Symposium. Philadelphia, PA, Dec. 26-31, 1971. Plenum Press: New York, NY; London, England, (p. 243-247), 275 p.; 1972

SOYBEANS; CROPS; ANIMALS; MICROBIOLOGY; FERTILIZERS; HERBICIDES; PESTICIDES; INDUSTRIAL EFFLUENTS; WASTES; DOMESTIC WASTES; WATERSHEDS; SOILS; FRUIT FLY; INDUSTRIAL WASTE

909
Subsurface Water Pollution by Percolation - Selected Abstracts.

Ryerson, W.R.; National Technical Information Service, Springfield, VA

Final Rept. July 1964-Oct. 1972; Monitoring Agency Rept. No. 18; NTIS-PK-134; 36 p.; 1972, November

WATER; LIQUID WASTE DISPOSAL; SOLID WASTE DISPOSAL; SANITARY LANDFILLS; GROUND WATER; SUBSURFACE DRAINAGE; PERCOLATION; LEACHING; SEPTIC TANKS; FERTILIZERS; WASTE DISPOSAL; EARTH FILLS; AGRICULTURAL WASTES; IRRIGATION; INORGANIC NITRATES; WATER QUALITY; PONDS; PESTICIDES; FERTILIZERS

The NTISEARCH information package (NTIS-PK) contains 35 selected abstracts of research reports retrieved using the NTIS on-line bibliographic search system--NTISEARCH. The abstracts include studies on percolation of pollutants from surface and subsurface sources such as septic tanks, leaching ponds, sanitary land fills, and pesticides and fertilizers used in agriculture practices.

910

Metabolic Fate of Dieldrin-14C in Wheat Plants and in an Agricultural Soil

Saha, J.G.; Lee, Y. W.

J. Econ. Entomol., 62(2), 670-671; 1970

CLAY LOAM; DIELDRIN; RADIOACTIVITY; ETHER; WATER; DEGRADATION; WHEAT; PLANTS; SANDY LOAM; GAS CHROMATOGRAPHY; TRACER; SOILS; SAND

In a soil metabolism study in which 1000 grams of a fertile clay loam soil was treated with 14C-labeled dieldrin 50 microCi, 72 mCi/millimole, the average distribution of radioactivity in the ether and water extracts from 100 grams of a soil was 3500, 99.0, and 2.0 nCi 0.1, indicating that very little degradation to hydrophilic products took place. The radioactive material in the ether extract was due to 14C-labeled dieldrin alone, as determined by 3 independent methods. When wheat plants were grown in a sandy loam soil treated with 14C-labeled dieldrin 1 microCi/g of soil and harvested 30 days later, the distribution of radioactivity in the ether and water extracts of the wheat plants was 180.0 97.0 and 5.6 3.0 nCi, respectively, indicating very little degradation to hydrophilic products. The radioactive material in the ether extract was identified as dieldrin by thin layer and gas chromatography, and co-crystallization with authentic dieldrin. Thus, little or no metabolism of dieldrin took place either in growing wheat plants or in the soil.

911

Mercury Residues in Cereal Grains from Seeds or Soil Treated with Organomercury Compounds

Saha, J.G.; Lee, Y.W.; Tinline, R.D.; Chinn, S.H.F.; Austenson, H.M.; Canada Department of Agriculture, Research Station, Saskatoon, Saskatchewan; University of Saskatchewan, Department of Crop Science, Saskatoon, Canada

Canadian Journal of Plant Science, 50, 597-599; 1970, September

MERCURY; RESIDUES; CEREALS; GRAINS; SEEDS; SOILS; BARLEY; WHEAT; PANOGEN PX; PANOGEN 15; MERCURY RETENTION; GAME BIRDS; FUNGICIDES; BIRDS

The purpose of this study was to determine the mercury content of barley and wheat grains grown from treated seeds or treated soil under Canadian prairie conditions. Conquest barley seeds were treated with Panogen PX, and Manitou wheat seeds were treated with Panogen 15. The harvested grains were analyzed for mercury residues. In another experiment, Panogen PX was disked into the soil, which was seeded with Thatcher wheat about a week later. Determinations were made on mercury residues in the harvested grain and in soil samples collected after the harvest. A significant amount of mercury was found in the grain grown in soil treated with Panogen PX, and 51 to 53 percent of the mercury estimated to have been applied remained in the soil five months after application. There was no significant difference in the mercury content of wheat and barley grains, whether or not they were grown from dressed grain. Researchers concluded that the reported contamination of game birds probably results from the birds eating dressed seed left uncovered by soil in the field or elsewhere.

912

Organochlorine Insecticide Residues in Soil from Vegetable Farms in Saskatchewan

Saha, J.G.; Sumner, A.K.

Pestic Monit J, 5(1), 28-31; 1971

ORGANOCHLORINE INSECTICIDES; RESIDUES; SOILS; VEGETABLES; DDT; DERIVATIVES; INSECTICIDES

913

Adsorption of Urea by Some Sudan Soils

Said, M.B.

Plant Soil, 36(1), 239-242; 1972

EXCHANGE CAPACITY; CLAY; HYDROLYSIS CONTROL; AUTOCLAVING; MERCURIC CHLORIDE; HYDROLYSIS; ADSORPTION; UREA; SOILS

914

BHC and DDT Residues in Arable Soil

Saito, M.; Kitayama, M.; Hokkaido Inst. Pub Health, Sapporo, Japan

Hokkaidoritsu Eisei Kenkyushoho (Rep. Hokkaido Inst. Pub. Health), 23, 116; 1973

BHC; DDT; AIR; SOILS; PADDIES; DDE; INSECTICIDES

Soil specimens from four paddy fields and three arable lands were collected in Nov.-Dec. 1972 and analyzed for alpha, beta, gamma, and delta-BHC, P, p'-DDT, and p,p'-DDE to assess the effect of the May 1, 1971, ban on BHC and DDT. The values found for the two types of land were 0.007-0.047 and 0.001-0.005 of alpha-BHC; 0.529-0.848 and 0.013-0.069 of gamma-BHC; 0.016-0.064 and trace-0.002 of delta-BHC; 0.051-0.232 and 0.135-0.845 of p,p'-DDT; and 0.009-0.045 and 0.018-0.69 ppm of p,p'-DDE. When these values were compared to those obtained two years before, considerable decreases were seen in both gamma-BHC and p,p'-DDT. Gamma-BHC in a paddy field decreased from 0.935 to 0.490 and p,p'-DDT from 0.052 to 0.036 ppm; gamma BHC in arable land decreased from 0.192 to 0.069 and p,p'-DDT from 1.272 to 0.845 ppm (all the values on an air-dried soil basis). The percentage decrease fluctuated, probably owing to the amounts of the insecticides applied, properties of the soil, the method of cultivation, and weather conditions.

915
Progress Report of Residue Studies on Dicamba Used for Ditchbank Weed Control

Salman, H.A.; Bartley, T.R.; Hattrup, A.R.; Bureau of Reclamation, Denver, Colorado Engineering and Research Center, Denver, CO

Report No. REC-ERC-72-6, PB-209 061; 20 p.; 1972, February

CHLORINE; IRRIGATION; RESIDUES; SOILS; WATER; ANALYSIS; DICAMBA; HERBICIDES; WEED CONTROL; IRRIGATION; SOLVENT EXTRACTION; GAS CHROMATOGRAPHY

The dimethylamine salt of dicamba was applied in the fall of 1970 to 4 dewatered laterals on the South Columbia basin irrigation district. The herbicide residues of dicamba and 5-hydroxy dicamba were determined in ditchbank and ditchbottom soils and in the first irrigation water released through the treated laterals in the spring. Solvent extraction, followed by gas chromatography, was used to measure the herbicide residues. Levels of dicamba in the irrigation waters, ditchbank soils, ditchbottom soils were measured. Dicamba slowly leached into the 6- to 12-inch soil depths during the winter. Good control of broad-leaved annuals was achieved the following summer on all treated laterals.

916
Adsorption-Desorption of Parathion as Affected by Soil Organic Matter

Saltzman, S.; Kliger, L.; Yaron, B.; Inst. Soils, Water, Agric. Res. Organ., Bet Dagan, Israel

J. Agr. Food Chem., 20(6), 1224-1226; 1972

PARATHION; SOILS; ADSORPTION; ORGANOPHOSPHORUS INSECTICIDES; DESORPTION; ORGANIC MATTER; INSECTICIDES

Parathion adsorption and desorption were determined for a dark rendzina, a Mediterranean soil and a terra rosa with 4.55, 3.72 and 4.88% organic matter, pH 7.1, 6.6 and 7.1 and montmorillonitic, mixed and kaolinitic clay, respectively. Adsorption and desorption were also determined after oxidation with H202 which decreased organic matter content to 2.12, 1.20 and 1.95%, respectively. The distribution coefficients for natural soil were 38.5, 76 and 164 for the Mediterranean soil, terra rosa and rendzina, respectively, and parathion adsorption decreased by 60, 22 and 70%, respectively, after oxidation. The parathion content after five consecutive extractions with water was greater than in natural soils than in oxidised soils.

917
Parathion Adsorption from Aqueous Solutions as Influenced by Soil Components

Saltzman, S.; Yaron, B.; Dep. Soils Water, Volcani Inst. Agric. Res., Bet Dagan, Israel

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24May) 1972, 6, 87-100; 1972

PARATHION; ADSORPTION; SOILS; AQUEOUS MEDIA; HUMUS; PEAT; SODIUM; MONTMORILLONITE; SATURATION; ADSORPTION ISOTHERMS; SODIUM KAOLINITE; KAOLINITE; SODIUM MONTMORILLONITE; GLASS BEADS; WATER; PESTICIDES

Organic material (peat with 95% organic matter) and sodium montmorillonite, over a concentration range of 1-9 micrograms g/ml, showed a very strong affinity for parathion, and were far from approaching saturation. Adsorption isotherms were obtained for 20 soils, sodium kaolinite, sodium montmorillonite, organic material, and glass beads. At the highest solution concentration, tested, sodium kaolinite was close to saturation, and the glass beads were saturated.

918
The Fate of Dieldrin in a Model Ecosystem

Sanborn, J.R.; Yu, C.C.; Illinois Natural History Survey

B. Env. Contam. & Tox., 10(6), 340; 1973, September

DIELDRIN; MODEL ECOSYSTEM; PESTICIDES; FATE; STABILITY; CHEMICAL TRANSFORMATION; BIOTRANSFORMATION

As part of a continuous program to investigate the effects of pesticides on the environment, the fate of dieldrin was examined in a model ecosystem. Examination of dieldrin clearly demonstrated the stability of this insecticide towards either biological or chemical modification by elements of the model ecosystem. Indications are that the extreme stability of dieldrin, might make it, like DDT, undesirable for widespread general use.

919
Preliminary Study of Mercury Residues in Soils Where Mercury Seed Treatments Have Been Used

Sand, P.F.; Wiersma, G.B.; Tai, H.; Stevens, L.J.

Pestic Monit J, 5(1), 32-33; 1971

MERCURY; RESIDUES; SOILS; SEED

920
Adsorption and Degradation of Chlorbromuron in Soil

Savage, K.E.

Weed Sci, 21(5), 416-420; 1973

THIN LAYER CHROMATOGRAPHY; FREUNDLICH EQUATION; PHYTOTOXICITY; MICROBIAL ACTIVITY; ADSORPTION; DEGRADATION; CHLORBROMURON; SOILS

921
Nitralin and Trifluralin Persistence in Soil

Savage, K.E.; South Weed. Sci. Lab., Agric. Res. Serv., Stoneville, Ms

Weed Sci.(WEESA6), 21(4), 285-8; 1973

NITRALIN; TRIFLURALIN; SOILS; HERBICIDES; PERSISTENCE; SILTY CLAY LOAM; LOAM; DISSIPATION; SORGHUM; AUTOCLAVING; PH; MICROBIOLOGY; CLAY; PHYTOTOXICITY

Nitralin and trifluralin applied to silty clay loam at 0.84 or 1.68 kg/ha dissipated to low residual levels within 3-4 months. Nitralin phytotoxicity to sorghum (SORGHUM BICOLOR) decreased more rapidly in a soil which was pretreated with nitralin, than in a soil with no previous treatment. Microbiological involvement is suggested, because this effect was nullified by autoclaving the previously treated soil. No such effect was observed with trifluralin. Nitralin was more persistent in acid than in a neutral soil.

922
Fluometuron Adsorption Desorption Equilibria in Soil

Savage, K.E.; Wauchope, R.D.

Weed Science, 22(2), 106-110; 1974

HERBICIDES; ORGANIC MATTER; LINEAR CORRELATIONS; AGITATION; ADSORPTION; DESORPTION; SOILS; EQUILIBRIUM

923
Effect of Pore Size on Diffusion Coefficients in Porous Media

Saxena, S.K.; Boersma, L.; Lindstrom, F.T.; Young, J.L.

Soil Sci., 117(2), 80-86; 1974

2,4-D; MATHEMATICAL MODEL; SOILS; PORE SIZE; POROUS MEDIA; MODEL

924
Technical Contribution to the Study of Migration of Certain Organic Compounds in Soils

Schiavon, M.; Jacquin, F.

Bull. Ec. Natl. Super. Agron. Ind. Aliment., 14(2), 221-225; 1972

TRIAZINE; HERBICIDES; MOBILITY; CHROMATOGRAPHY; ADSORPTION; LEACHING; DEGRADATION; SOILS; ORGANIC MATTER

925
The Metabolism of Carbamate Pesticides - A Literature Analysis. Part II

Schlagbauer, A.W.J.; Schlagbauer, B.G.L.

Residue Rev., 42, 85-90; 1972

CARBAMATE; METABOLISM; DEGRADATION; LANDRIN; FORMETANATE; PROPOXUR; CARBARYL; METHIOCARB; MERCAPTODIMETHUR; PLANTS; INSECTS; MAMMALS; MICROORGANISMS; SINGLE ENZYME SYSTEMS; HYPOTHESIS; METABOLITES; HYDROLYSIS; WARM-BLOODED; REVIEW

Literature on carbamate metabolism published between May, 1970 and June, 1971 is reviewed. Specific information on degradation of landrin, formetanate, propoxur, carbaryl, p-chlorophenyl n-methyl carbamate, and methiocarb (mercaptodimethur) by plants, insects, mammals, soil microorganisms, and single enzyme systems is included. These later studies confirm the previously advanced hypothesis that a variety of metabolites is formed by each system and only the quantitative ratios differ. Hydrolysis is the most important pathway for degradation of N-substituted n-alkylcarbamates; warm-blooded animals excrete more conjugates of hydrolysis products than of hydroxylation products and hydroxylation predominates in plants. The basic degradation pathways of carbamates appear to be well established. (11 references)

926
Possibilities and Limitations of Biological Purification of Drinking Water

Schmidt, K.

Gas Wasser Abwasser, 53(2), 38-49; 1973

PURIFICATION; DRINKING WATER; SAND FILTERS; PESTICIDES; WATER; DDT; SAND; ADSORPTION; HEXACHLOROBENZENE; LINDANE; MALATHION; HYDROLYSIS; DEGRADATION; DIMETHOATE; PHOSPHAMIDON; LINURON; DIURON; CHLORINATION; OZONIZATION; CARBON; FILTRATION; RESIDUES

Possibilities and limitations of mechanical, chemical, and biological purification of drinking water are reviewed, and experiments on the efficiency of slow sand filters in the retention of pesticides from drinking water during purification are described. A slow sand filter retained DDT dosed in the microgram range quantitatively over 50 days, partly due to the adsorption of DDT on suspended matter and filter material. A complete elimination of hexachlorobenzene by sand filter was observed over 29 days. The percentage not retained afterwards was only 1.6%. Sand filters were able to retain less than 50% of lindane starting from the first day of application; the rate of malathion elimination increased to over 90% in five days, partly due to hydrolysis and microbial degradation. Sand filters were not able to decrease the dimethoate concentration. The rate of elimination of phosphamidon applied at a rate of 200 mg/l, decreased from 90% to 6% in 10 days. Sand filters were ineffective for linuron, diuron, and 2,4-D; however, 2,4-D showed decreasing concentration due to microbial degradation starting from the 5th day of introduction. Chlorination, ozonization, and especially activated carbon treatment effectively reduced pesticide concentrations in drinking water. Anaerobic filtration was suitable for the elimination of lindane residues from drinking water. (32 references)

927
Reactions of Humic Substances with Organic Chemicals, N-containing Compounds, and Physiological Properties of Humic Substances

Schnitzer, M.; Khan, S.U.; Soil Res. Inst., Canada Dept. Agr., Ottawa, Ontario, Canada

Part of Humic Substances in the Environment, Marcel Dekker, Inc., New York, N.Y., (p. 281-293); 1972

ADSORPTION; PESTICIDES; HUMUS; TEMPERATURE; ADSORPTION; PH; REVIEW; ION EXCHANGE; SODIUM HUMATE; DDT; HYDROGEN BONDING; ORGANIC CHEMICALS; NITROGEN COMPOUNDS; DIALYSIS

Adsorption of pesticides by humic substances is generally studied with the slurry technique, but can be determined by dialysis. Elevation of temperature increases adsorption which is optimum at higher temperatures and pH values approximating the pKa of the pesticide. A review of the literature shows that hydrogen bonding and ion exchange are the primary mechanisms of adsorption although much remains to be learned about the nature of humic substances. In addition to adsorption capability, sodium humate can act as a solubilizing agent for compounds like DDT.

928
Moisture Influences on Bromacil Distribution in the Soil and Resultant Uptake and Phytotoxicity

Schreiber, J.D.; Oregon State Univ., Corvallis, Oregon

Thesis, Oregon State University, Corvallis, Oregon, 124 p.; 1972

BROMACIL; SOILS; PHYTOTOXICITY; SOIL MOISTURE

929
Persistence and Degradation of the Fungicide. 1. 2,-Bis-3-Methoxycarbonyl-2-Thioureidobenzene in Soil

Schultz, I.R.; Fleeker, J.R.

Proc. N. Dak. Acad. Sci., 27(1), 31; 1973

PERSISTENCE; DEGRADATION; FUNGICIDES; SOILS; 1,2,-BIS-3-METHOXYCARBONYL-2-THIOUREIDOBENZENE

930
Movement and Metabolism of Phorate Under Field Conditions After Granular Band Applications

Schulz, K.R.; Lichtenstein, E.P.; Fuhremann, T.W.; Liang, T.T.; Dep. Entomol., Univ. Wisconsin, Madison, Wi

J. Econ. Entomol.(JEENAI) 1973, 66(4) 873-5; 1973

PHORATE; SOILS; RESIDUE; INSECTICIDES; DEGRADATION; METABOLISM; GRANULAR BAND APPLICATION; APPLICATION; INSECTS; PHORATE SULFONE; PHORATE SULFOXIDE; MOVEMENT; VERTICAL MOVEMENT; HORIZONTAL MOVEMENT

More than 4 months following granular band application of phorate (5 and 10 lb/acre), residues had moved in both horizontal and vertical directions and test insects (DROSOPHILA MELANOGASTER) were controlled up to 2-4 inches from the application site. Phorate metabolism was most rapid in the soil plots treated with 5 lb/acre phorate. Phorate sulfone was the major component in all soil cores from the plots treated with 5 lb/acre phorate. The relative composition of the soil cores from the 5 lb/acre treatment was phorate sulfone greater than phorate sulfoxide greater than phorate, whereas the relative composition of soil cores from the 1/pound/acre treatment was phorate greater than phorate sulfone greater than phorate sulfoxide.

931
Persistence of Hexachlorobicyclo(2.2.1)Heptene Derivatives

Schupha. I.; Ballschmiter, K.; Inst. Anorg. Chem. Ker chem., Univ. Mainz, Mainz, Ger.

Fresenius' Z. Anal. Chem.(ZACFAU), 259(1), 25-8; 1972

ALDRIN; DEGRADATION; DIELDRIN; ENDOSULFAN; INSECTICIDES; PERSISTENCE; CHLOROBICYCLOHEPTENE; SOILS; HEPTENE; GAS CHROMATOGRAPHY; MOVEMENT

The persistence of hexachlorobicyclo (2.2.1) heptene and some derivitives, aldrin, dieldrin, and endosulfan, was investigated by following the dechlorination by microtitration of Cl according to R. Belcher, et al. (1962) and the formation of reaction products by gas chromatography. The samples were decomposed by hydrolysis in 4 and 2N KOH in aq. Meoh at 50 degrees and 25 degrees respectively and by UV irradiation in aq. Meoh at 22 degrees. Dechlorination in soil under the influence of pH is hardly possible. Photochemical dechlorination on leaf surfaces and in the atmosphere might be a significant route of degradation.

932
Chemical and Sediment Movement from Agricultural Land into Lake Erie: Project Completion Rept. 1 Jul 65-30 Jun 72

Schwab, G.O.; Mclean, E.O.; Ohio State Univ., Columbus. Water Resources Center.

Ohio State Univ., Columbus. Water Resources Center, PB 213 192/8; Report No. 390X; Contract DI-14-01-0001-3535; Monitoring Agency Rept No. W73-01957, OWRR-A-018-OHIO (1); Proj. OWRR-A-018-OHIO 41 p.; 1972, September

MOVEMENT; DICAMBA; PARAQUAT; HERBICIDES; SURFACE WATER; RUNOFF; FERTILIZERS; PESTICIDES; LAKES; SURFACE DRAINAGE; NUTRIENTS; ELECTRICAL RESISTIVITY; PH; BIOCHEMICAL OXYGEN DEMAND; PHOSPHORUS; NITROGEN; SEDIMENTS; LEACHING; SOIL CHEMISTRY; ALDRIN; DIELDRIN; HEPTACHL... WATER

933
Picloram Persistence in Semi Arid Range and Soils and Water

Scifres, C.J.; Hahn, R.R.; Colon, J.D.; Merkle, M.G.; Texas A & M University, College Station, Tx

Weed Sci, 19(4), 381-384; 1971

HERBICIDES; RESIDUES; RUNOFF; IRRIGATION; RANGELAND; SOILS; SEMI-ARID SOILS; PICLORAM; WATER

Residues in semi-arid soil after application of 0.25 lb/acre picloram were usually restricted to the top 12 inches for 60 days. Less than 5 ppb were detected below 12 inches 120 to 180 days after application but the herbicide was usually dissipated from the profile within a year. Five months after application, more picloram was detected at 6 to 19 inches at the lower end of plots with a 3% slope than those with 0-2% slopes. Run-off water from plots irrigated 10 days after treatment contained 17 ppb picloram, but run-off after 20 to 45 days contained less than 1 ppb picloram.

934
Diffusion of Selected Herbicides in Water and in Soil to Soybeans

Scott, H.D.; Univ. Kentucky, Lexington, Ky.

Thesis, University of Kentucky, Lexington, Kentucky; Univ. Microfilms, Ann Arbor, Mich., Order No. 72-21, 483 p.; 1971

HERBICIDES; DIFFUSION; SOYBEANS; WATER; SOILS

935
Release of Herbicides from Clay Minerals as a Function of Water Content. Part 1. Kaolinite

Scott, H.D.; Lutz, J.F.; North Carolina Agricultural Experiment Station, Raleigh, NC

Soil Sci Soc Am Proc, 35(3), 374-379; 1971

SIMAZINE; DIURON; CHLORPROPHAM; FLUOMETURON; 2,4-D; ATRAZINE; MOVEMENT; HERBICIDES; CLAY; MINERALS; KAOLINITE; ADSORPTION; RELEASE; TRACER

Equilibrium pressures of 0.3, 0.5, 1.0, 5.0, 10 and 15 bars were successively applied to kaolinite suspensions containing 1 and 4 ppm of carbon 14-labelled 2,4-D, fluometuron, atrazine, chlorpropham, diuron and simazine. For all the herbicides except simazine the concentration in the extracts decreased with increasing pressure. The decreases were greatest with diuron and chlorpropham. Simazine concentration was 2-3 times greater in high than in low pressure extracts. Fluometuron and 2,4-D were negatively adsorbed, the others were positively adsorbed. The order of release in terms of total recovery of herbicide applied at the 1-ppm rate was: fluometuron greater than 2,4-D greater than atrazine greater than chlorpropham greater than simazine greater than diruon. At the 4 ppm rate release of 2,4-D was greater than that of fluometuron. Total herbicide recovery ranged from 12% for diuron to 92% for fluometuron.

936
Self-Diffusion Coefficients of Selected Herbicides in Water and Estimates of Their Transmission Factors in Soil

Scott, H.D.; Phillips, R.E.; Dept. Agron., Univ. Arkansas, Fayetteville, AR

Soil Sci. Soc. Amer. Proc., 37(6), 965-967; 1973

SOILS; HERBICIDES; WATER; TRANSMISSION FACTORS; SELF-DIFFUSION COEFFICIENT; DIFFUSION COEFFICIENTS

Self-diffusion coefficients of selected herbicides were measured in aqueous solution by the capillary tube method. The diffusion coefficients were approximately 0.6 x 1E-5 cm-squared/sec at 23 C and were not particularly related to the configuration of the herbicide molecule. Values calculated for the transmission factors of these herbicides differed with the more mobile compounds being associated with the higher values. (11 references)

937
Diffusion of Herbicides to Seed

Scott, H.D.; Phillips, R.E.

Weed Sci, 19(2), 128-132; 1971

SOYBEANS; GLYCINE-MAX; SEEDS; CHLORPROPHAM; DIFFUSION; HERBICIDES

938
Diffusion of Selected Herbicides in Soil

Scott, H.D.; Phillips, R.E.; Kentucky Agric. Exp. Stn., Lexington, Ky

Soil Sci. Soc. Amer., Proc.(SSSAA8), 36(5), 714-19; 1972

SOILS; DIFFUSION; ADSORPTION; LOAM; CHLORPROPHAM; DIPHENAMID; PROMETONE; TRANSFORMATION; TRIFLURALIN; ISOTHERMS; FLUOMETURON; SIMAZINE; ATRAZINE; PROMETRYNE; 2,4-D; BENEFIN; HERBICIDES; ANALYSIS; RATE; VOLATILIZATION VAPOR PHASE; SOLUTION PHASE; CLAY

The diffusion coefficients of herbicides were measured in silty clay loam. The self-diffusion coefficients of 2,4-D, chlorpropham, diphenamid, and prometone decreased as the diffusion time increased, suggesting that changes in the structure might have occurred. The rate of diffusion increased with the soil water content for all herbicides, except trifluralin. Linear adsorption isotherms were obtained. The order of adsorption was: 2,4-D less than fluometuron less than prometone less than simazine less than atrazine less than diphenamid less than prometryne less than chlorpropham less than trifluralin less than benefin. Correlation analysis showed that the diffusion coefficients of the nonvolatile herbicides were inversely related to the amount of adsorption, indicating that most of the diffusion occurred in the solution phase. For volatile herbicides, diffusion occurred in the vapor phase and the solution phase.

939
Movement of Herbicides through Soil to Soybean Roots

Scott, H.D.; Phillips, R.E.

Agron. J., 65(3), 386-390; 1973

HERBICIDES; SOYBEAN; ROOTS; CHLORPROPHAM; ATRAZINE; ABSORPTION; MASS FLOW; PERMEABILITY; TRANSPORT; SOILS

940
Influence of Artificial Rainfall and DI-1-P-Menthene on Karbutilate Movement in Greenhouse Soil

See, R.M.; Hurtt, W.; Veg. Control Div., Fort Detrick, Frederick, MD

Proc. Northeast. Weed Sci. Soc. (PNWSBF), 28, 127-32; 1974

HERBICIDES; SOIL EROSION; KARBUTILATE; MOVEMENT; SOIL MOISTURE; RAINFALL

941
Adsorption of the Herbicide Gramoxone Under Soil Conditions

Segi, I.; Mar'Enko, V.G.; Guyesh, P.; Timiryazev S.-Kh. Akad., Moscow, USSR

Izv. Timiryazev. Sel'Skokhoz. Akad.(IZSAA7), (4), 14-19; 1973

GRAMOXONE; SOILS; ADSORPTION; BENTONITE; HUMUS; CATIONS; AZOTOBACTER; ASSAY

942
Microbial Degradation of Insecticides in Flooded Soil and in Anaerobic Cultures

Sethunathan, N.; Cent. Rice Res. Inst., Cuttack, India

Residue Rev.(RREVAH), 47, 143-65; 1973

DEGRADATION; INSECTICIDES; LINDANE; BHC; DDT; HEPTACHLOR; METHOXYCHLOR; ENDRIN; TDE; CHLORDANE; DIELDRIN; ALDRIN; BIOCHEMICAL TRANSFORMATIONS; REDUCTIVE DECHLORINATION; HYDROLYSIS; DIAZINON; PARATHION; NITRO-GROUP REDUCTION; MICROORGANISMS; ORGANOCHLORINE; INSECTICIDES; ORGANOPHOSPHATES; ANAEROBIC; SOILS; FLOODING; HEXACHLOROBENZENE; WATER; REVIEW; ENDRIN; DEGRADATION PRODUCTS

Current knowledge of microbial degradation of organochlorine and organophosphate insecticides in flooded soil and anaerobic cultures is reviewed. Certain organochlorine insecticides (lindane, other isomers of BHC, DDT, heptachlor, methoxychlor, endrin) are rapidly biodegradable in flooded soil; others (TDE, chlordane, dieldrin, aldrin) belonging to the same group are degraded slowly. In flooded soil, biochemical transformations, reductive dechlorination (DDT), hydrolysis (diazinon and parathion), and nitro-group reduction (parathion) have been demonstrated. (68 refs)

943
Degradation of Parathion in Flooded Acid Soils

Sethunathan, N.; Cent. Rice Res. Inst., Cuttack, India

J. Agr. Food Chem.(JAFCAU), 21(4), 602-4; 1973

PARATHION; SOILS; ORGANOPHOSPHORUS INSECTICIDES; DEGRADATION; HUMUS; PH; SULFATE; MICROBES; HYDROLYSIS; FLOODING; WATER; NITROPHENOL; HEAT; CARBON; ISOLATION; ACID SULFATE; ALLUVIAL SOIL; INSECTICIDES; DEGRADATION PRODUCTS

As shown in the laboratory, the degradation degree of parathion in 5 flooded acid soils increased with the organic matter content. Fastest degradation occurred in an acid sulfate soil, with an organic matter content of 12.2%, due to microbial participation. Parathion was rapidly hydrolyzed to p-nitrophenol in a flooded alluvial soil, following its repeated applications. The activity of parathion-hydrolyzing enriched culture from the alluvial soil, was retarded by heat treatment, indicating the role of biological agents in the hydrolysis. BACILLUS sp., capable of decomposing p-nitrophenol, as a sole carbon source, was isolated from parathion-amended flooded alluvial soil.

944
Diazinon Degradation in Submerged Soil and Rice Paddy Water

Sethunathan, N.; Dept. Soil Microbiol, Internat. Rice Res. Inst., Los Banos, Laguna

Adv. Chem. Ser., 111, 244-255; 1972

DEGRADATION; DIAZINON; MICROORGANISMS; HYDROLYSIS; MINERALIZATION; RICE; PADDIES; PERSISTENCE; FLOODING; INSECTICIDES; METABOLITES; DEGRADATION PRODUCTS

Diazinon persisted for about 15 days in a flooded soil (pH 6.6) that had been treated previously with the insecticide; but, in a flooded soil that had never been exposed to diazinon, it persisted for about 60 days. Similarly, water from a diazinon-treated field inactivated the insecticide within 5 days after incubation. Microorganisms that developed in response to insecticide application accelerated its hydrolysis and the subsequent mineralization of the hydrolysis product, 2-isopropyl-6-methyl-4-hydroxypyrimidine, to CO2. A FLAVOBACTERIUM sp., isolated from water of a treated rice field, had exceptionally high capability to metabolize diazinon as sole carbon source. This provides unequivocal evidence that microbes are involved in the rapid inactivation of diazinon in rice fields.

945
Organic Matter and Parathion Degradation in Flooded Soil

Sethunathan, N.; Cent. Rice Res. Inst., Cuttack, India

Soil Biol. Biochem.(SBIOAH), 5(5), 641-4; 1973

PARATHION; PERSISTENCE; RICE STRAW; SOILS; DEGRADATION; FLOODING; HUMUS; WATER; STAGNANT WATER; INOCULATION; HYDROLYSIS; P-NITROPHENOL; DIETHYL TRIPHOSPHORIC ACID; NITRO REDUCTION; AMINOPARATHION; METABOLITES; PATHWAYS; ORGANIC MATTER; METABOLISM; DEGRADATION PRODUCTS

In soils inoculated with an enrichment culture (pooled standing water samples) which exhibited an exceptionally high ability to hydrolyze parathion, rice straw amendments inhibited parathion hydrolysis, that is, parathion to p-nitrophenol and diethyl thiophosphoric acid. In uninoculated soils, however, rice straw enhanced parathion degradation. Via nitro reduction aminoparathion and an unidentified metabolite (apparently possessing a p=s bond) were detected in uninoculated soils amended with rice straw. The influence of organic matter on parathion persistence in flooded soil is apparently governed by the metabolic pathway involved in the degradation process.

946
Increased Biological Hydrolysis of Diazinon After Repeated Application in Rice Paddies

Sethunathan, N.; Pathak, M.D.; International Rice Research Institute, Los Banos, Laguna, Philippines

Journal of Agricultural and Food Chemistry, 30(3), 586-589; 1972

HYDROLYSIS; DIAZINON; PADDIES; DEGRADATION; 2-ISOPROPYL-6-METHYL-4-HYDROXYPYRIMIDINE; RICE; SOILS; RHIZOSPHERE; MICROORGANISMS; METABOLITES; MINERALIZATION; DEGRADATION PRODUCTS

Repeated application of diazinon granules to soil affected the development of a microbial factor which caused the rapid degradation of diazinon. No degradation occurred in non-diazinon treated plots. The degrading activity of materials collected from diazinon-treated plots was in the order paddy water greater than rhizosphere soil greater than non rhizosphere soil. When incubated with water from diazinon-treated fields, diazinon was hydrolyzed to 2-isopropyl-6-methyl-4-hydroxypyrimidine in 75 hours. In the next 25 hours this hydrolysis product was completely mineralized.

947
Degradation of Chlorinated Hydrocarbons by Clostridium Species Isolated from Lindane-Amended, Flooded Soil

Sethunathan, N.; Yoshida, T.; Cent. Rice Res. Inst., Cuttack, India

Plant Soil(PLSOA2), 38(3), 663-6; 1973

CLOSTRIDIUM; LINDANE; DECOMPOSITION; METHOXYCHLOR; BACTERIA; CHLORINATED PESTICIDE; DEGRADATION; WATER; FLOODING; HEPTACHLOR; ANAEROBIC; RADIOACTIVITY; CARBON DIOXIDE; METHANE; TRACER; CARBON 14; BREAKDOWN; DEGRADATION PRODUCTS

A clostridium species isolated from flooded soil amended with lindane decomposed methoxychlor, lindane, and heptachlor in that order under anaerobic conditions. During the bacterial degradation of ring-labeled lindane, there was a loss of radioactivity from the reaction mixture release of $^{14}CO_2$ during the degradation of carbon 14-labeled lindane was negligible. CH_4 was not an end product of lindane breakdown.

948
Conversion of Parathion to P Nitrophenol by Diazinon Degrading BACTERIUM FLAVOBACTERIUM-Sp

Sethunathan, N.; Yoshida, T.

Proc. Inst. Environ. Sci., 18, 255-257; 1972

PARATHION; PHENOL; DIAZINON; DEGRADATION; NITROPHENOL; BACTERIA

949
Parathion Degradation of Submerged Rice Soils in the Philippines

Sethunathan, N.; Yoshida, T.; Dept. Soil Microbiol., Internat. Rice Res. Inst., Los Banos, Laguna

J. Agr. Food Chem(JAFCAU), 21(3), 504-6; 1973

PARATHION; PERSISTENCE; RICE; SOILS; FLAVOBACTERIUM; DEGRADATION; DEGRADATION PRODUCTS

The persistence of parathion (0,0 diethyl O p nitrophenyl phosphorothioate) in 4 Philippine rice soils was investigated in submerged and upland conditions. The parathion in the soils after incubation at 30 degrees was extracted with a hexane acetone mixture and the amount was determined by gas chromatography. The insecticide disappeared more rapidly from submerged soils than from upland soils. In submerged soils parathion was reduced to aminoparathion (0,0 diethyl O p aminophenyl phosphorothioate). Autoclaving of the soils increased the persistence of parathion under submerged conditions, indicating microbial participation in its degradation. Parathion degraded faster in flooded soil inoculated with parathion hydrolyzing flavobacterium sp. than in uninoculated soil.

950
Effect of Atrazine on the Rate of Nitrification in Black Clay Loam Soil

Setty, R.A.; Saligar, V.C.; Patil, S.V.; Univ. Agric. Sci., Dharwar, India

Mysore J. Agric. Sci., 4, 111-113; 1970

ATRAZINE; NITRIFICATION; SOILS; LOAM; CLAY

When applied to the soil in conjunction with $(NH_4)_2SO_4$, atrazine at 10 ppm gave a higher nitrification rate after 2 weeks incubation than the control soil or soil receiving higher rates of atrazine did, but after 5 weeks incubation the nitrification rate was lowest in soil receiving the 100 ppm level.

951

Influence of Dalapon (2,2-Dichloropropionic Acid) on Biotic Potential of Soil

Sharma, L.N.; Saxena, S.N.; Govt. Agr. Res. Station, Durgapura, Jaipur (Rajasthan), India

Andhra Agr. J., 18(2), 74-78; 1971

DALAPON; MICROORGANISMS; POTTED SOIL; FUNGI; SOILS; DECOMPOSITION

Soil microorganisms were counted at intervals from 2-32 days after application of various amounts of dalapon to potted soil which had been inoculated with AZOTOBACTER CHROOCOCCUM to give special stress on this microbe. Dalapon significantly decreased AZOTOBACTER and the bacterial population at concentrations above 3.0 ppm and increased actinomycetes at 1.5 ppm or greater. No significant effect on soil fungi was noted. Maximum activity was observed between days 8 and 14, and it was assumed that most of the dalapon was decomposed during this period.

952

Microbial Degradation of Phenoxy Herbicides in Culture, Soil, and Aquatic Ecosystems

Sharpee, K.W.; Cornell Univ., Ithaca, Ny

Dissertation; Cornell Univ., Ithaca, Ny; University Microfilms Order No. 73-20, 177 p.; 1973

PHENOXY HERBICIDES; HERBICIDES; BIODEGRADATION; AQUATIC ECOSYSTEMS; PERSISTENCE; SOILS; DEGRADATION; 2,4-D; ENZYME; MANGANOUS IONS; CHLOROSUCCINATE; CHLOROMALEYLACETATE; SUCCINATE; FRESHWATER; SEDIMENTS; 2,4,5-T; PHENOL; LACTONIZATION; CONVERSION; FUMARATE; MALATE; COENZYMES; DEGRADATION PRODUCTS

In studies on degradation of 2,4-D, 2-chloro-4-carboxymethylene but-2-enolide was formed from cis, cis-2,4-dichloromuconate by a lactonizing enzyme obtained from ARTHROBACTER sp. isolated from soil. Manganous ions were required for activity and stability of the lactonizing enzyme. In experiments aimed at determining intermediates between 2-chloromaleylacetate and succinate, both d-chlorosuccinate and l-chlorosuccinate were poor substrates for ARTHROBACTER sp., indicating that chlorosuccinate is not an intermediate in conversion of chloromaleylacetate to succinate. Cell-free extracts of the organism converted the chlorosuccinate compounds to small amounts of malate and fumarate, indicating that the last chlorine from 2,4-D was removed by displacement with a hydroxyl group. A pathway was proposed for the metabolism of 2,4-D, in which coenzyme a is the carrier for the intermediates between chloromaleylacetate and succinate. In soil and in a fresh water and sediment system small amounts of 2,4-dichlorophenol or 2,4,5-trichlorophenol accumulated during degradation of 2,4-D or 2,4,5-T. Neither of the phenols persisted as long as the parent herbicides. Degradation appeared to be mainly microbial. One or more unknown compounds was detected when 2,4-D was added to the fresh water and sediment system and persisted long after the 2,4-D had disappeared.

953

Lindane Diffusion in Soil

Shearer, R.C.; Letey, J.; Farmer, W.J.; Klute, A.; Dept. Soil Phys., Univ. California, Riverside, Ca

Soil Sci Soc Am Proc, 37(2), 189-193; 1973

INSECTICIDES; WATER; AIR; SOLID INTERPHASES; TRANSFER; PATHWAYS; DIFFUSION, WATER; VAPOR; SILT LOAM; LINDANE

Vapor and nonvapor diffusion of lindane was measured in Gila silt loam at various soil water contents. The apparent vapor diffusion coefficient (D(v)) increased rapidly as water content increased to 4%. There was a gradual decreased in d(v) as water content increased from 4 to 20% and then a rapid decrease at water contents greater than 20%. The nonvapor apparent diffusion coefficient (D(s)) also reached a maximum at 4% water content and declined at water contents between about 4 and 20%. D(s) increased as water content was increased above 20%. Apparently diffusion in the nonvapor phase occurs at the water air and water solid interface as well as in the water. The contribution of these pathways to the total transfer is dependent upon water content. It was assumed that the water solid diffusion coefficient would be constant at water contents above 4%. The air water interface diffusion was highest at 4% water content and decreased at higher water contents. Diffusion in water was essentially zero at water contents below 15% and increased with increasing water contents above this value.

954

Persistence of Triazine Herbicides in Soils

Sheets, T.J.

Part of Gunther, F.A. (Ed.), Residue Reviews, Vol. 32. Triazine Herbicides. Symposium. Springer-Verlag: New York, N.Y.; Heidelberg, West Germany. 1970 (p. 287-310) 413 p.; 1970

PLANTS; UPTAKE; WEATHER; PERSISTENCE; TRIAZINE; SOILS; HERBICIDES

955

The Extent and Seriousness of Pesticide Buildup in Soils

Sheets, T.J.

Paper presented at AAAS Meeting in Wash, 18 p.; 1966, December 26-31

PESTICIDES; BUILDUP; SOILS

956

Contamination of Surface and Ground Water with Pesticides Applied to Cotton

Sheets, T.J.; Bradley, J.R.; Jackson, M.D.; North Carolina Water Resourc. Res. Inst., Raleigh, N. C.

U. S. Nat. Tech. Inform. Serv., PB Rep.(XPBRCA) 1972, (No. 210148,) 68 p.; 1972

PESTICIDES; WATER; SOILS; GROUNDWATER; COTTON; GROUND WATER

957
Persistence of Benzoic and Phenylacetic Acids in Soils

Sheets, T.J.; Smith, J.W.; Kaufman, D. D.

Weed Sci., 16(2), 217-222; 1968

PERSISTENCE; BENZOIC ACID; PHENYLACETIC ACIDS; ACIDS; SOILS

958
Adsorption of DDT by Soils, Soil Fractions, and Biological Materials

Shin, Y.C.; Chodan, J.J.; Wolcott, A.R.; Department of Crop and Soil Service, Michigan State University, East Lansing, Michigan

J Agr Food Chem, 18(6), 1129-1133; 1970

SOILS; PLANTS; ADSORPTION; FUNGI; TISSUE; PRECIPITATION; ORGANIC MATTER; SOIL FRACTIONS; MUCK

Linear adsorption isotherms were obtained for p,p prime-DDT and unextracted or H2O2-digested soils at aqueous matrix concentrations less than 1 ppb. Precipitation contributed increasingly to disappearance of DDT at equilibrium supernatant concentrations above 2 ppb, and was the principal mechanism above 4 ppb. Removal of materials soluble in ether and alcohol increased adsorption by mineral soils. After ether and alcohol extractions, the kd per unit of C was 2-3 times greater in mineral soils than it was in muck or fungal or plant tissue. This relationship between mineral and organic soils was maintained through subsequent sequential extractions with hot water, 2% HCL and digestion with H2O2. deviations from linearity increased with successive extractions through 2% HCl. The data illustrate 3 probable sources of anomaly in attempts to relate adsorption of non-ionic pesticides to soil organic-matter content.

959
Soil-Applied Herbicides in the Control of Temperature Zone Grasses, Broadleaf Weeds and Woody Plants

Shipman, R.D.; Pennsylvania State Univ. University Park, PA

Final Rept. May, 1969 - Aug. 1971, Penn. State Univ.; Contract DAAA 13-69-C-0085; AD-732 502; 153 p.; 1971, Aug.

960
The Ecosystem Approach to Herbicide Evaluation

Shipman, R.D.

Proc. Northeast Weed Control Conf., 25, 55-64; 1971

RESIDUES; ANALYSIS; FENURON; SOILS; TERRESTRIAL ECOSYSTEMS; HERBICIDES; OATS

961
Influence of Soil Moisture on Phytotoxicity and Residual Activity of Simazine(CAT) and CIPC

Shiraishi, K.V.; Watanabe, T.; Ehime Prefect. Agric. Exp. Stn., Matsuyama, Japan

Zasso Kenkyu(ZASKAN), (14), 51-5; 1972

SIMAZINE; CHLOROPHENYLCARBAMATE; PHYTOTOXICITY; SOIL MOISTURE; SOILS; BARLEY

Under humid conditions, barley germination and initial growth were greatly affected by isopropyl 3-chlorophenylcarbamate and to a lesser extent, by simazine (CAT). The injury was mostly prevented by covering the crop with greater than 3 cm soil layer. CAT in the soil had a residual effect after 5-7 months under dry conditions.

962
The Depth of Penetration with Water of the Pesticide BHC in the Presence of Sulfanol into the Ground

Shtarkas, E.M.

Gig Sanit, 37(2), 106-108; 1972

GRANULOMETRIC; SOILS; COMPOSITION; ADSORPTION; WATER; PESTICIDES; BHC; PERSISTENCE; SULFANOL

963
Degradation of Parathion by Bacteria Isolated from Flooded Soil

Siddaramappa, R.; Rajaram, K.P.; Sethunathan, N.; Dep. Soil Microbiol., Cent. Rice Res. Inst., Cuttack, India

Appl. Microbiol.(APMBAT), 26(6), 846-7; 1973

PARATHION; DEGRADATION; BACTERIA; FLOODING; WATER; HYDROLYSIS; NITRITE; NITROPHENOL; NITROGEN DIOXIDE; DEGRADATION PRODUCTS

Two bacteria, BACILLUS sp. and PSEUDOMON AS sp. were isolated from parathion amended soil which exhibited parathion-hydrolyzing ability. Nitrite was liberated by BACILLUS from the parathion-hydrolysis product, p-nitrophenol, but not from parathion, whereas PSEUDOMON AS hydrolyzed parathion, and then released NO2 from p-nitrophenol. These results establish parathion degradation by bacteria past the p-nitrophenol stage to the end product, NO2.

964
Soils Capacity for Accepting Organic Fertilizers

Siegel, O.

Bodenkultur., 24(3), 237-252; 1973

METALS; WASTES; ORGANIC FERTILIZERS; FOOD; SOILS

965
Behavior of Lindane in Soild and in Water

Sieper, H.; E. Merck A.-G., Darmstadt, Germany

Schriftenr. Ver. Wasser-, Boden-, Lufthyg., Berlin-Dahlem(SVWLAE), No. 37, 175-85; 1972

REVIEW; LINDANE; SOILS; WATER

966

Residue Analysis and Degradation of Morphactins.

Sieper, H.; E. Merck, Darmstadt, Germany

Part of Fate of Pesticides in Environment, Gordon and Breach, London (p. 157-174); 1972

RESIDUES; MORPHACTINS; FLURENOL; FLURECOL; FLUORENONE; CEREALS; GRASS; WATER; DEGRADATION; DEGRADATION PRODUCTS; 2-CHLOROFLUORENONE; IRRADIATION; SOILS; HALF=LIFE

Various Flurenol (flurecol) compounds have been studied by colorimetric methods. After the active ingredient was extracted from the sample, cleaned up by preparative chromatography on silica gel, and transformed to a blue derivative of fluorenone, it was measured at 597 nm. Flurenols degrade rapidly in cereals, grass, water, and soil, as evidenced by the degradation curves (half-life=1-2 days). The definitive degradation product, 2-chlorofluorenone, was found in the soil after chloroflurenol methylester application. Irradiation (uv) in an aqueous or benzene solution also results in 2-chlorofluorenone formation. (10 refs)

967

Determination and Degradation of Dithianon, Pyridinitrile and Flurenol in Soil and Water

Sieper, H.; E. Merck AG, Abt. Pflanzenschutz, Darmstadt, German Federal Republic

Schriftenreihe des Vereins fur Wasser-, Boden- und Lufthygiene, 34, 109-115; 1971

DEGRADATION; DITHIANON; PYRIDINITRILE; FLURENOL; WATER; HALF-LIFE; LOAM; SOILS; LEACHING; PESTICIDES

The compounds were extracted with dichlomethane, purified by TLC, dissolved in methylene chloride and estimated colorimetrically. The half life of the compounds in eutrophic water was 1-4 days. The compounds did not leach readily from a slightly acid sandy loam in which the half lives of dithianon and flurenol esters were 18 and 1.5 days respectively.

968

Movement of Agricultural Fertilizers and Organic Insecticides in Surface Runoff

Sievers, D.M.; Lentz, G.L.; Beasley, R.P.; Engineering Dept., Univ. Missouri, Columbia, MC

Trans. ASAE (Amer. Soc. Agr. Eng.) 13(3), 323-325; 1970

MOVEMENT; INSECTICIDES; SOILS; ORGANIC MATTER; ABSORPTION; HEPTACHLOR; ALDRIN; RUNOFF; SEDIMENTS; PHORATE; DIAZINON; HEPTACHLOR EPOXIDE; CLAY

The movement of insecticides applied as granules to experimental plots of three different soils appeared to be largely dependent on their rate of absorption by the clay and organic matter of the soil. The greatest amounts of heptachlor (and its epoxide) and aldrin were found in sediment of soil with low clay content, and aldrin was absorbed by the soil with low clay content, and aldrin was absorbed by the soil to a greater extent than heptachlor. Less heptachlor and aldrin were found in runoff water than in sediment. Phorate appeared in the sediment of all soils at about the same rate, and only small amounts (traces to 2.5 ppb) were found in runoff water. The loss of diazinon was influenced to some extent by clay content. Due to the use of corncob granules for this insecticide large losses occurred in poorly drained soil.

969

Microbial Conversions of Dithiocarbamate Fungicides

Sijpesteijn, A.K.; Vonk, J.W.

Meded. Rijksfac. Landbouwwetensch. Gent, 35(2), 799-804; 1970

FATE; DIALKYIDITHIOCARBAMATES; BISDITHIOCARBAMATE; FUNGICIDES; FERBAM; ZIRAM; THIRAM; NABAM; ZINEB; MANEB; ETHYLENEDIAMINE; ETHYLENETHIURAM MONOSULFIDE; ETM; ETHYLENETHIOUREA; ETU

The fate of dialkydithiocarbamate and bisdithiocarbamate fungicides; ferbam, ziram, thiram and nabam, zineb and maneb, respectively, in the soil was studied. Nabam is transformed nonenzymatically into ehtylenediamine, ethylenethiuram monosulfide (ETM) and ethylenethiourea (ETU). The first compound is easily metabolized but ETM becomes ETU which is quite stable to microbial attack. The microorganisms included PSEUDOMONAS FLUORESCENS, MYCOBACTERIUM PHLEI, BACILUS SUBTILIS, ASPERGILLUS NIGER, SACCHAROMYCES CEREVISIAE, AEROBACTER AEROGENES and BACTERIUM HERBICOLA. (19 references)

970

The Injurious Effect of Mercury Vapor From Bichloride of Mercury in Soil of Rose Houses

Simmerman, P.W.; Crocker, W.

Boyce Thompson Inst., Prof.Paper, 1(23), 222-225; 1933

BICHLORIDE; MERCURY; AIR; BUDS; TANKAGE; RATE; REDUCTION; VAPOR; ROSES; MERCURY BICHLORIDE

The organic matter of the soil reduces the bichloride to metallic mercury and the vapours of the mercury rise into the air and kill the buds: when the soil is rich in tankage or other organic matter, the rate of reduction of the bichloride is increased, and consequently the severity of the injury.

971

Persistence of Disyston Residues in Soil and Plant

Singh, K.; Gulati, K.C.; Dewan, R.S.; Indian Agric. Res. Inst., New Delhi, India

Indian J. AGr. Sci.(IJASA3), 42(2), 1135-8; 1972

DISYSTON; RESIDUES; SOILS; PLANTS; SORGHUM; SYSTEMIC INSECTICIDES; PERSISTENCE

972

Effect of Nemagon on Some Soil Properties

Singhal, J.P.; Singh, C.P.; Aligarh Muslim Univ., Aligarh, Uttar Pradesh, India

Indian J. Agr. Sci., 43(3), 280-284; 1973

SOILS; NEMAGON; DIBROMOCHLOROPROPANE; CALCIUM CARBONATE; PH; NITROGEN; PHOSPHORUS; POTASSIUM

In doses from 0 to 2.5 mg/5 kg of soil, nemagon (dibromochloropropane) increased the electrical conductivity of the soil but had no marked effect on the pH or calcium carbonate content. A maximum increase in soil organic matter was observed 45 days after treatment with most doses. Significantly higher available nitrogen was found after 45 days exposure to 1 ml of nemagon/5 kg of soil, but large doses inhibited this parameter. In 30 days a maximum level of available phosphorus was found with an application of 1.5 mg/5 kg of soil. A decrease in available potassium was observed after 45 days in treated soil.

973

Residues of Atrazine, Cyanazine, and their Phytotoxic Metabolites in a Clay Loam Soil

Sirons, G.J.; Frank, R.; Sawyer, T.; Prov. Pestic. Residue Test. Lab., Ontario Minist. Agric. Food, Guelph, Ontario, Canada

J. Agr. Food Chem. (JAFCAU), 21(6), 1016-20; 1973

ATRAZINE; METABOLITES; SOILS; CYANAZINE; METABOLISM; CLAY LOAM; LOAM; TRANSFORMATION; DEETHYLATION; DEISOPROPYLATION; CYANAZINE AMIDE; RESIDUES; DEGRADATION PRODUCTS

In clay loam soil, atrazine was converted to 2-chloro-4-amino-6-isopropylamino-s-triazine (deethylated atrazine) as major and to 2-chloro-4-amino-6-ethylamino-s-triazine (deisopropylated atrazine) as minor phytotoxic metabolites, and cyanazine was converted to the deisopropylated atrazine as the major phytotoxic metabolite. Cyanazine amide was also found. The concentration of deethylated atrazine reached peak concentrations in the soil 5-6 months after application of atrazine, whereas peak concentrations of deisopropylated atrazine were reached 2-3 months after atrazine or cyanazine application.

974

Some Effects of an Insecticide (Dursban) and a Weedicide (Linuron) on the Microflora of a Submerged Soil

Sivasithamparam, K.

Riso 19, 339-346; 1970

MICROFLORA; DURSBAN; LINURON; CLAY; LOAM; DENITRIFIERS; FUNGI; INSECTICIDES; WEEDKILLERS; SOILS; MICROORGANISMS; DENITRIFICATION

Dursban and linuron were applied to Welimada clay loam (pH 5.35) and all microbiological analyses were made with the soil incubated in the dark. Aerobic bacteria, actinomycetes, ammonifers, sulphate reducers, cellulose, decomposers and heterotrophic iron precipators were all stimulated by both chemicals at both times of sampling (3 weeks and 3 months). Both treatments generally depressed denitrifers. Dursban temporarily inhibited the aerobic P dissolvers and the aerobic N fixers at the second sampling. Linuron stimulated fungi at both samplings and the aerobic N fixers at the second sampling. Dursban increased the algal population while linuron suppressed it.

975

Biological and Chemical Degradation of Atrazine in 3 Oregon Soils

Skipper, H.D.; Volk, V.V.; Oregon State University, Corvallis, Oregon

Weed Sci, 20(4), 344-347e; 1972

HERBICIDES; SOIL MOISTURE; DETOXIFICATION; DEGRADATION; ATRAZINE; HYDROXYATRAZINE; LOAM; CLAY; SILT LOAM; DETOXIFICATION; HYDROLYSIS

Microbial degradation of atrazine and hydroxyatrazine in a loam, a clay and a silt loam was dependent on soil type, atrazine concentration and moisture content. The hydroxyatrazine ring was attacked more readily than the atrazine ring. Hydroxyatrazine accounted for 10% of the extracted C14 from 4 atrazine treated clay and loam, and for 40% from the silt loam detoxification of the atrazine in the silt loam was mainly by hydrolysis and in the other soils it took place by a combination of chemical hydrolysis and slow microbial degradation.

976

Movement of Prometryne in Irrigated Carbonate Chernozem

Skoblin, A.P.; Zakordonets, V.A.; Drozdova, O.A.; Krymskii Pedagogicheskii Institut, Simferopol', USSR

Agrokhimiya 5, 140-143; 1972

MOVEMENT; PROMETRYNE; CHERNOZEM; PENETRATION; PERSISTENCE; IRRIGATION; SOILS

In a 3-year experiment in which prometryne was applied 3-5 days before the emergence of carrot seedlings on southern carbonate heavy loamy chernozem, the prometryne penetrated as deep as 15 cm within a month after application. The final depth reached was 30-60 cm, depending on the rate of application. Toxicity persisted 3.5-5.0 months.

977
Herbicide Effectiveness, Soil Residues, and Phytotoxicity to Peach Trees

Skroch, W.A.; Sheets, T.J.; Smith, J.W.; N.C. State Univ., Raleigh, NC

Weed Sci., 19, 257-60; 1971

PHYTOTOXICITY; TREES; DICHLOBENIL; TERBACIL; 3-TERT-BUTYL-5- BROMO-6-METHYLURACIL; DP-733; HERBICIDES; SOILS; RESIDUES; PEACHES; FRUITS; ACCUMULATION

Dichlobenil, terbacil and 3-tert-butyl-5-bromo-6-methyluracil (DP-733) were applied annually as soil surface or incorporated treatments for 3 years. The herbicides did not accumulate in the 0-15 cm soil layer. Low concentrations were detected at 30-60 cm 1 year after the third annual application of 6.72 kg/ha dichlobenil and 4.48 kg/ha of DP-733. Terbacil was not detected at 30-60 cm but was presented in the 15-30 cm layer of the 4.48 kg/ha plots.

978
Use and Residues of Mercury Compounds in Agriculture

Smart, N.A.

Residue Rev., 23, 1-36; 1968

USAGE; RESIDUES; MERCURY; AGRICULTURE; REVIEW; CROPS; SOILS

A review of use of mercury compounds agriculture, including mercury residues in soil and crops. (109 references)

979
The Loss of Five Thiolcarbamate Herbicides in Nonsterile Soils and Their Stability in Acidic and Basic Solutions

Smith, A.; Fitzpatrick, A.; Canada Dep. Agric., Saskatchewan, Canada

J. Agric. Fd Chem., 18, 720-722; 1970

LOAM; EPTC; VERNOLATE; PEBULATE; DIALLATE; TRIALLATE; HYDROLYSIS; THIOLCARBAMATE; HERBICIDES; SOILS; STABILITY; DEGRADATION; CLAY

In Regina heavy clay and Weyburn loam, EPTC, vernolate, pebulate and diallate were lost within 2 to 4 weeks while the loss of triallate was much slower. Treatment with 10 N NaOH solution at 95 degrees C for 1 hr did not affect EPTC, pebulate or vernolate, but diallate and triallate were degraded under milder alkaline conditions. In acid solution a higher concentration of H_2SO_4 was required for the hydrolysis of EPTC, vernolate and pebulate than for that of diallate and triallate.

980
Transformation of Dicamba in Regina Heavy Clay

Smith, A.E.; Regina Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

J. Agr. Food Chem.(JAFCAU), 21(4), 708-10; 1973

SOILS; DICAMBA; HERBICIDES; TRANSFORMATION; CLAY; TRACER; WATER; REGINA HEAVY CLAY; GAS CHROMATOGRAPHY; RADIOCHEMICAL ANALYSIS; CALCIUM CHLORIDE; SODIUM HYDROXIDE; TRANSFORMATION; CARBON DIOXIDE; 3,6-DICHLOROSALICYLIC ACID; SALICYLIC ACID; CARBOXYLATION; BREAKDOWN; DEGRADATION PRODUCTS

The degradation of dicamba, carbon 14-labeled in the carboxyl group, was studied in moist nonsterile regina heavy clay at 25 degrees. Following soil experimentation with 0.1m $CaCl_2$, gas chromatography and radiochemical analysis were used to monitor the breakdown at weekly intervals. Loss was rapid, with only 10% of the applied dicamba being recovered after 5 weeks. Further treatment with 1 n NaOH rec overed small amounts of dicamba, and increasing quantities of 3,6-dichlorosalicylic acid. At the end of 5 weeks, approximately 26% of the dicamba was transformed. $^{14}CO_2$ was also liberated from the treated source, indicating that dicamba, or 3,6-dichlorosalicylic acid, or both, underwent decarboxylation.

981
The Hydrolysis of 2,4-D Acetate Esters to 2,4-D in Saskatchewan Soils

Smith, A.E.; Canada Department of Agriculture, Research Station, Regina, Saskatchewan

Weed Res., 12(4), 364-372; 1972

ELECTRON CAPTURE GAS CHROMATOGRAPHY; ESTERS; 2,4-D; SOILS

The iso-propyl and n-butyl esters were easily hydrolysed in soils of pH 7.0-7.5, the recoveries being less than 15% after 1.5h and 0% after 24h. Loss of the iso-octyl ester was slower, approximately 20-30% remaining after 24h and 10% after 48h.

982
Influence of Calcium Hydroxide and Sulfur on 2, 4-D Degradation in Soil

Smith, A.E.; Georgia University Agricultural Experimental Station

Soil Sci, 113(1), 36-41; 1972

GAS CHROMATOGRAPHY; MICROBIAL ACTIVITY; FERTILIZERS; HERBICIDES; CALCIUM HYDROXIDE; SULFUR; 2,4-D; DEGRADATION; SOILS

Sterilized and nonsterilized sandy loam soil (pH 6.8, 2.7% organic matter) was incubated with 0-4000 ppm S or $Ca(OH)_2$ at field capacity for 2 weeks; 2,4-D was then added and incubation was continued for a further 2 weeks. 2,4-D degradation in non-sterilized soil was significantly inhibited by S concentrations greater than 100 ppm and was almost completely inhibited by 500 ppm S. 2,4-D degradation in non-sterile soils treated with $Ca(OH)_2$ was greatest at pH 7.0-7.4 (500 and 1000 ppm $Ca(OH)_2$) and high rates of $Ca(OH)_2$ significantly decreased 2,4-D degradation. S and $Ca(OH)_2$ did not affect 2,4-D degradation in sterile soil.

983

Degradation, Adsorption and Volatility of Diallate and Triallate in Prairie Soils

Smith, A.E.; Res. Stn, Can. Agric., Regina, Sask

Weed Res, 10(4), 331-339; 1970

HERBICIDES; GAS CHROMATOGRAPHY; MICROBIOLOGY; BREAKDOWN; LOAM; WILTING POINT; DEGRADATION; CLAY; SOILS; DECOMPOSITION; LEACHING; ADSORPTION; VOLATILITY; PRAIRIE SOILS

In laboratory experiments with Weyburn loam (pH 6.5), 50% of the di-allate applied at rates of 2.25 to 2.50 lb/acre was degraded after 4 weeks, when moisture was in excess of wilting point. In Regina heavy clay (pH 7.8) the losses were slightly lower. in both soils little degradation was observed at moisture levels below wilting points. As negligible losses occured in sterile soils, microbial degradation was considered an important factor in di-allate breakdown. In both soils, tri-allate decomposition was slower. Highest di-allate leaching occurred in weyburn loam. In 4 soils, tri-allate was almost completely adsorbed from aqueous solution. Vapour losses of di-allate depended on soil type and temperatures whereas for tri-allate they were negligible even on heating to 50 degrees c for 28 days. In the field, 15-20% of the applied tri-allate was found in the top 5 cm after 1 growing season, and only 5% of the initial di-allate. Negligible residues of both herbicides were found at the 5-10 cm level.

984

Degradation of Dicamba in Prairie Soils

Smith, A.E.

Weed Res., 13(4), 373-378; 1973

GAS CHROMATOGRAPHY; TEMPERATURE; HERBICIDES; MICROBIAL DECOMPOSITION; MOISTURE; SOILS; DEGRADATION; DECOMPOSITION; DICAMBA

985

Degradation of Bromoxynil in Regina Heavy Clay

Smith, A.E.; Regina Res. Stn., Canada Dep. Agric., Regina, Sask.

Weed Res.(WEREAT), 11(4), 276-82; 1971

BROMOXYNIL; CLAY; SOILS; HERBICIDES; DECOMPOSITION

At rates equivalent to 14 kg/ha greater than 50% of the applied bromoxynil was degraded in Regina heavy clay in 2 weeks at 25 degrees and at moisture levels above the wilting point. Losses at 18 degrees were slower, and little breakdown occurred in sterile Regina clay soil, indicating that microbial activity coiuld be important. The decomposition products included small amounts, of 3,5-dibromo-4-hydroxybenzamide and 3,5-dibromo-4-hydroxybenzoic acid. Bromoxymil was determined in soil by extraction with 0.4% KOH in MeOH, evaporation, solution in 10% KCl, and spectormetry at 282-4 nm. Recoveries were 68-72% from bromoxynil-fortified moist clay after 24 hr of equilibration. No interferences were found. After spectrometry the solution was acidified with HCl and extracted with EtOAc. The organic phase was dreid, evaporated, and the residue dissolved in MeOH for chromatography on paper (2-PROH-NH4OH-H2O, 20:1:2) or on silica gel plates (C6H6-EtOAo, 1:1) to seperate and identify decomposition products.

986

Disappearance of Triallate from Field Soils

Smith, A.E.; Canada Dep. Agric., Regina, Sask.

Weed Sci.(WEESA6) 1971, 19(5) 536-7; 1971

TRIALLATE; SOILS; DISAPPEARANCE; HERBICIDES; RESIDUE; PRAIRIE SOILS

Triallate can persist in prairie soils and could be carried over from one growing season to the next, suggesting that care should be taken when sensitive crops, such as oats, are being grown in rotation with wheat. Field plots were treated with 2.8 kg triallate/ha in emulsion form. After 1 growing season (5 months) the residues remaining in the 0-5 and 5-10 cm soil levels were determined by gas chromatography. No residues were detected at the 5-10 cm level, whereas 16-25% of the applied herbicide was found in the top 5 cm level.

987

Persistence of Trifluralin in Small Field Plots as Analyzed by a Rapid Gas Chromatographic Method

Smith, A.E.; Canada Department of Agriculture, Regina, Saskatchewan

Journal of Agricultural and Food Chemistry, 20(4), 829-831; 1972

PERSISTENCE; TRIFLURALIN; GAS CHROMATOGRAPHY; ANALYSIS

988

Degradation of Dinitramine (N3, N3-Diethyl 2,4-Dinitro-6-Trifluoromethyl-M-Phenylenediamine) in Soil

Smith, R.A.; Belles, W.S.; Shen, K.; Woods, W.G.; U.S. Borax Res. Corp., Anaheim, Ca

Pestic. Biochem. Physiol.(PCBPBS), 3(3), 278-88; 1973

DINITRAMINE; SOILS; DEGRADATION; HERBICIDES; SILT LOAM; LOAM; TRACER; RADIOACTIVITY; METHYL HYDROXIDE; METHYL CYANIDE; METABOLITES; THIN LAYER CHROMATOGRAPHY; EXTRACTION

The degradation of dinitramine, incorporated at 0.5 lb/acre (0.6 ppm), in Anaheim silty loam soil was studied over an 8-month period. For both trifluoromethyl-14C-labeled dinitramine and ring-uniformly-labeled dinitramine, only 20% of the radioactivity was lost in 8 months from the incorporation zone. MeOH- or MeCN-extractable radioactivity decreased rapidly during the initial 60 days, and only 20% remained after 244 days. One metabolite was 6-amino-1-ethyl-2-methyl-7-nitro-5-(trifluoromethyl)benzimidazole (at 0.06 ppm), and unchanged dinitramine was detected at 0.05 ppm. Two other metabolites were tentatively identified by thin-layer chromatography. As n3-ethyl-2,4-dinitro-6-(trifluoromethyl)-m-phenylenediamine (at 0.01 ppm) and 6-amino-2-methyl-7-nitro-5-(trifluoromethyl)benzimidazole (at 0.01 ppm). Effective extraction methods are described.

989

Chemical Stability of DDT and Related Compounds in Selected Alkaline Environments

Smith, S.; Parr, J.F.; Soil Water Conserv. Res. Div., Agric. Res. Serv., Baton Rouge, La.

J. Agr. Food Chem.(JAFCAU), 20(4), 839-41; 1972

DDT; STABILITY; ALKALINE ENVIRONMENT; ORGANOCHLORINE INSECTICIDES; SOILS; INSECTICIDES; DEGRADATION PRODUCTS; DDE; DDD; DDMU

DDT was stable in soil treated with anhydrous NH3 up to pH 10, and in sterile, buffered, glass microbeads up to pH 12. The threshold pH for dehydrochlorination of DDT to DDE in microbeads was 12.5, with greater than 70% conversion at pH 13.0, where the amount of applied DDT unaccounted for increased from 20% at 140 hr to 50% after 30 days, suggesting the formation of intermediates that were lost during extraction, or were not detectable. Applied DDE was relatively stable in microbeads at pH 13.0, where nearly complete recovery was obtained after 7 days. However, extended incubation to 28 days allowed a gradual disappearance of DDE with only 88 and 75% accounted for at pH 10.0 and 13.0, respectively suggesting a time-depenedent pH relation. Similar pH effect was shown on the dehydrochlorination of DDD to DDMU (1-chloro-2,2-bis(p-chlorophenyl)ethylene). While DDD was stable at pH 10.0, it converted rapidly to DDMU at pH 13.0.

990

Chemical Stability of DDT and Related Compounds in Selected Alkaline Environments

Smith, S.; Parr, J.F.

J Agric Food Chem, 20(4), 839-841; 1972

AMMONIA TREATED SOILS; DEHYDROCHLORINATION; PH; ELECTRON CAPTURE; GAS CHROMATOGRAPHY; INCUBATION; GLASS BEADS; DDE; DDD; 1 CHLORO-2 2-BIS-CHLOROPHENYL ETHYLENE; SOILS

991

Effects of Surface Area Exchange Capacity and Organic Matter Content On Miscible Displacement of Atrazine in Soils

Snelling, K.W.; Hobbs, J.A.; Powers, W.L.

Argon J, 61(6), 875-878; 1969

HERBICIDES; MOVEMENT; ORGANIC MATTER; ATRAZINE; SOILS

992

Transport, Distribution, and Degradation of Chlorinated Hydrocarbon Residues in Aquatic Model Ecosystems

Soedergren, A.; Dep. Anim. Ecol., Univ. Lund, Lund, Swed.

Oikos(OIKSAA), 24(1), 30-41; 1973

INSECTICIDES; DEGRADATION; TRANSPORT; AQUATIC ECOSYSTEMS; CHLOPHEN; DDT; DDE; MODEL ECOSYSTEM

993

Colorimetrically Determinable Herbicides. Analysis, Degradation, and Toxicology

Soerensen, O.; Hyg. Inst. Ruhrgebiets, Gelsenkirchen, Germany

Vom Wasser(VJWWAU), 38, 17-26; 1971

HERBICIDES; COLORIMETRY ANALYSIS; ADSORPTION; SOILS; DEGRADATION

Procedures were given for determination of herbicides in dilute aqueous solutions by adsorption on ion exchange resins, elution, and colorimetric analysis. Included were methods for determination of chlorate, paraquat, diquat, aminotriazole, and maleic hydrazide. Use of these methods revealed that paraquat and diquat were adsorbed irreversibly to filter sand and to humous soil in columns, whereas the other herbicides were not adsorbed. The adsorptive capacity of a 1-cm deep layer of sand was 8.4 g/m2 for paraquat and 9.5 g/m2 for diquat. Study of the biological degradation of the herbicides in moist soil revealed the following half-lives: NaClO3, 4 days; aminotriazole, 40 hr; diquat, several months; paraquat not or very slowly degraded. The slow degradation rates of diquat and paraquat were due to their firm binding to ion exchangers in the soil. The toxicology of the herbicides studied was reviewed.

994
Effect of Herbicides on the Biological Activity of the Soil

Soldatov, A.B.; Bartut'Ko, N.; Latushkin, L.

Tr. Beloruss. Sel'Skokhoz. Akad. (TBSAA2), 76, 131-7; 1971

HERBICIDES; SOILS; CATALYSIS; ALIPUR; PROMETRYNE; AMIBEN; SIMAZINE; PYRAMIN; SUGAR BEETS; GATNON; LENACIL; ENZYME

Alipur (1.2-2.4 KG/HA), prometryne (1.5-3.5 KG/HA), and amiben (4-6 KG/HA), applied 3-4 days before sugar beet sowing, and pyramin (3-5 KG/HA), simazine (2 KG/HA), gatnon (4-6 KG/HA), and lenacil (2-4 KG/HA), applied 2-4 days after sowing, decreased the soil catalase activity during the first 10 days after application, but in the later period the enzyme activity was similar to that in untreated soil.

995
Degree and Rate of Degradation of Some Pesticides Under Intensive Chemical Control for Sugar Beet Protection

Sovljanski, R.; Inst. Agr. Res., Novi Sad, Yugoslavia

Bull. Sci. Cons. Acad. Sci. Arts RSF Yougoslavie Sect. A, 18(1-3), 23-24; 1973

DEGRADATION; PESTICIDES; SUGAR BEETS; DDT; FOLIAGE; HEPTACHLOR; TRICHLORFON; ROOTS; PLANTS; FODDER; THIOMETON; PERSISTENCE; RESIDUES

Results of a three year study of the degradation rates of pesticides used on sugar beets indicate that the root may be used as fodder several days after one or two treatments with DDT while the leaves should not be used for this purpose until six weeks after treatment. Other efficient, but less persistent insecticides should be substituted for DDT to maintain a tolerance limit level of insecticide on the foliage. The residues of heptachlor found were completely harmless, and the use of this insecticide has been satisfactory. Trichlorfon on the foliage was degraded to the tolerance limit within 10 days and had almost completely disappeared in 15 days. The roots of plants treated with trichlorfon were fit for fodder immediately. Thiometon residues were below tolerance limits at all harvesting dates and hence treated plants could be fed even to dairy cows.

996
A Systematic Method for Evaluating the Potential Environmental Impact of New Industrial Chemicals

Sowinski, E.J.; Suffet, I.H.

Part of Barrekette, Noval S. (Ed.). Pollution Engineering and Scientific Solutions. Proceedings of the First International Meeting of the Society of Engineering Science. Tel Aviv, Israel, June 12-17, 1972. Plenum Press: New York, NY; London, England, (95-104), 784; 1973

POLYCHLORINATED BIPHENYLS; PESTICIDES; BIODEGRADATION; PCB; INDUSTRY

997
Comment on Chemistry and Metabolism of Terminal Residues of Organophosphorus Compounds and Carbamates

Spencer, E.Y.; Res. Inst., Canada Dep. Agric., London, Ontario, Canada

Pestic. Chem., Proc. 2nd Int. Congr. Pestic. Chem., (24WAAY) 1972, 6, 315-317; 1972

REVIEW; ORGANOPHOSPHATES; INSECTICIDES; METABOLISM; CARBAMATES

998
Distribution of Pesticides Between Soil, Water, and Air

Spencer, W.F.

Part of Pesticides in the Soil: Ecology, Degradation, and Movement, Mich. State Univ., E. Lansing, Mich., p. 120-128; 1970

DISTRIBUTION; PESTICIDES; SOILS; WATER; AIR; DEGRADATION; MOVEMENT

999
Pesticide Volatilization

Spencer, W.F.; Univ. of CA, Riverside, California

Residue Reviews, 49, 1-45; 1973

VAPOR PRESSURE; VOLATILIZATION; LOSS; DEGRADATION PRODUCTS; SOILS; PESTICIDES; TRANSPORT; DISSIPATION; REVIEW; RATE; MERCURY

Literature pertaining to moderately and slowly volatile pesticides with vapor pressures less than 1E-2 mm mercury is reviewed. Factors affecting volatilization losses, mechanisms of volatilization, indirect and direct measurement of volatilization losses, volatilization of degradation products, and calculations of the magnitude of potential volatilization rates under field conditions are discussed. Volatilization from soils is emphasized since a high percentage of applied pesticides ultimately reaches the soil. Evidence demonstrating the significant roles of volatilization and vapor-phase transport in dissipation of pesticides is discussed.

1000
Desorption of Lindane from Soil as Related to Vapor Density

Spencer, W.F.; Cliath, M.M.

Soil Sci. Soc. Amer. Proc., 34(4), 574-578; 1970

DESORPTION; LINDANE; VAPOR DENSITY; SOILS; INSECTICIDES; ADSORPTION; VOLATILIZATION; ISOTHERMS; GILA SILT LOAM; WATER; GAS SATURATION; BENTONITE; FREUNDLICH EQUATION

The vapor density of 4-50 microgram/gram lindane absorbed on Gila silt loam with a water content of 2.2, 3.94 or 10% was measured at 20, 30 and 40 degrees C by a gas saturation method. Vapor density was also measured for 2.5-20 microgram/gram lindane absorbed on bentonite at 65% water content and 30 degrees C. Water content had no effect on vapor density until the soil was dried to 2.2% water content (that is, a monomolecular layer of water). When more than 2.2% water was present in Gila silt loam, vapour density increased with temperature and lindane concentration until a saturated vapor density, equal to that of lindane without soil was reached at 50, 55 and 62 ppm lindane at 20, 30 and 40 degrees C, respectively. Desorption isotherms for lindane on Gila silt loam and bentonite fitted the Freundlich equation.

1001
Pesticide Volatilization as Related to Water Loss from Soil

Spencer, W.F.; Cliath, M.M.; California Agric. Exp. Stn., Agric. Res. Serv., Riverside, Ca

J. Environ. Qual.(JEVQAA), 2(2), 284-289; 1973

PESTICIDES; VOLATILIZATION; SOILS; LINDANE; DIELDRIN; WICK EFFECT; WATER; CODISTILLATION; EVAPORATION; HUMIDITY

A water loss accelerated the volatilization rate of dieldrin and lindane from the soil, but only after the soil surface had been depleted of the respective pesticide. The enhanced volatilization rate was due to the wick effect, rather than to codistillation. Pesticides which are carried to the surface of the soil in evaporating water can either volatilize immediately, or after remoistening of the soil surface following drying. Thus lindane would volatilize concurrently with water, since it is more water-soluble than dieldrin, which would rise to the soil surface during periods of low moisture and relative humidity and then volatilize rapidly upon remoistening.

1002
Volatility of DDT and Related Compounds

Spencer, W.F.; Cliath, M.M.; Soil Water Conserv. Res. Div., Agric. Res. Serv., Riverside, Calif.

J. Agr. Food Chem.(JFACAU), 20(3), 645-649; 1972

DDT; DDE; VOLATILIZATION; SOILS; VAPOR PRESSURE; ORGANOCHLORINES; INSECTICIDES

Vapor pressures of two DDT isomers, and of some of their degradation products, measured by gas saturation, indicated that the o,p' isomers are more volatile than the p,p' isomers. The vapor pressure of O.p'-DDT was 7.5 times that of P,p'-DDt. At 30 degrees, the atmosphere above a surface deposit of technical grade DDT contained 62% o,p'-DDT. When technical grade DDT was applied to moist soil at 20 micrograms/g, the atmosphere in the above the soil contained equal amounts of o,p'-DDT and p,p'-DDT, but at higher concentrations the ratio of o,p'- to p,p'-DDT in the vapor phase increased. Dieldrin applied with DDT did not affect the DDT vapor density. Air drying of soil reduced volatility of all compounds. The primary breakdown product of DDT, p,p'-DDE has a higher vapor pressure than the original compound, p,p'-DDT, indicating that much of the DDT now present in the soil may voltilize as DDE.

1003
Vapor Density of Soil Applied Dieldrin as Related to Soil Water Content, Temperature and Dieldrin Concentration

Spencer, W.F.; Cliath, M.M.; Farmer, W.J.

Soil Sci. Soc. Am. Proc., 33(40), 509-511; 1969

DIELDRIN; VAPOR; VOLATILIZATION; DIFFUSION; SOILS; STREAMS; NITROGEN GAS; GILA SILT LOAM; WATER; GAS-WASHING; HEXANE; GAS LIQUID CHROMATOGRAPHY; CHLORINATED HYDROCARBONS; INSECTICIDES; SILT LOAM

Data relating solid-phase dieldrin concentration in soil to vapor density as affected by the soil-water content and temperature are presented and the implication of the results to volatilization from soils and to diffusion through soils is discussed. The vapor density of dieldrin was determined by measuring the amount of dieldrin in a stream of nitrogen gas slowly moving through a column of Gilla silt loam containing various concentrations of dieldrin. The dieldrin was removed from the nitrogen gas stream in gas-washing bottles containing hexane and its concentration in hexane was determined by electron-capture gas-liquid chromatography. Vapor densities at 20, 30 and 40 degrees C were determined on each column made up at a particular dieldrin concentration and/or water content. Results demonstrated that vapor densities of dieldrin in dieldrin-soil mixtures increased with temperature and dieldrin concentration but were not affected by soil water content until the water content decreased below that equivalent of one molecular layer of water. Vapor densities dropped to very low values when the water content fell below this level, but increased again as water was added to the dry soil, indicating that the drying effect is reversible. When more than a monomolecular layer of water was present in the soil, vapor density increased with increasing soil dieldrin concentration until a saturation vapor density equal to that of dieldrin without soil (54, 202 and 676 ng dieldrin/l at 20, 30 and 40 degrees C respectively,) was reached at approximately 25 ppm dieldrin. This implies that surface application of dieldrin and probably other similar chlorinated hydrocarbon insecticides will volatilize as rapidly from mineral soils as from the pure materials until the concentration at the surface falls to relatively low levels. The data indicate that loss of water, per se, is not required for significant rates of volatilization to occur from soils or other surfaces on which water can successfully compete for adosrption sites. (9 references)

1004

Volatility of DDT Residues in Soil as Affected by Flooding and Organic Matter Applications

Spencer, W.F.; Cliath, M.M.; Farmer, W.J.; Shepherd, R.A.

J. Environmental Quality, 3(2), 126-129; 1974

FLOODING; DDT; METABOLITES; ISOMERS; MANURE; ALFALFA; DDD; DDE; ADSORPTION; VOLATILIZATION; DEGRADATION; WATER; HUMUS; ORGANIC MATTER; RESIDUES

In a field experiment, flooding with and without organic matter additions was evaluated as a means of preferentially degrading residual DDT and thereby changing the ratio of the various isomers and metabolites volatilizing from the soil surface. Flooding for a 7-week period, either with or without manure or alfalfa (MEDICAGO SATIVA L.) meal applications, effectivley degraded DDT isomers, primarily to the respective DDD isomers, but had little effect on DDE isomers. Both flooding and organic matter decreased the volatility even when soil concentrations were not affected, apparently because of increased adsorption of the compounds by added organic matter or by organic matter in the soil altered by flooding. The data indicate that minor changes in vapor concentration ratios were accomplished by flooding and organic matter additions, but regardless of treatment, the major constituent evaporating from the surface was p,p'-DDE. To accomplish significant changes in volatilization patterns, it will be necessary to use such management practices before a major part of the DDT has been degraded to DDE. However, flooding and organic matter treatments will ultimately decreases the total quantity of DDE volatilizing from residual DDT in soils over long-time periods because of their effectiveness in degrading DDT to DDD instead of DDE.

1005

Pesticide Volatilization

Spencer, W.F.; Farmer, W.J.; Cliath, M.M.

Residue Rev., 49, 1-47; 1973

PLANT SURFACES; PENETRATION; VAPOR PHASE; TRANSPORT; MOVEMENT; RATE; SOILS; WATER; PESTICIDES; VOLATILIZATION

1006

Factors Determining Monuron Stability in Soil

Spiridonov, Y.Y.; Kamenskii, V.I.; USSR

Tr. Vses. Nauch.-Issled. Inst. Udobr. Agropochvoved.(TVUAAG) 1971, 51, 271-283; 1971

PHYTOTOXICITY; MONURON; SOILS; HERBICIDES; STABILITY

1007

Factors Determining the Stability of Atrazine in Soil

Spiridonov, Y.Y.; Kamenskii, V.I.; Vses. Nauchno-Issled. Inst. Fitopatol., Gruzin, Fil. Kobuleti, Adzharsk. USSR

Agrokhimiya, 6, 112-120; 1970

AERATION; STABILITY; ANAEROBIC; SOILS; ATRAZINE; SOIL MOISTURE; TEMPERATURE; PERSISTENCE; HUMUS

In laboratory experiments with the humus horizon of 9 soil types, the rate of inactivation was determined more by temperature, moisture content and aeration than by soil type, and was greatest at 40-60 degrees C, 60-100% of full moisture capacity, and under anaerobic conditions. Inactivation was as rapid in continuously gleyed horizons of meadowbog soils practically devoid of a microflora as it was in the aerated humus horizon. The percentage inactivation of atrazine per unit of time was not affected by the rate of application.

1008

Influence of Soil Type on the Efficacy of Disulfoton and Menazon in Control of Pea Aphid on Canning Peas-D

Sprecht, H.B.; Chisholm, D.

J. Econ. Entomol., 63 (5), 1970, 1588-1589

INSECTICIDES; SOILS; DISULFOTON; MENAZON; PEAS; APHIDS

1009

Formation of 3,3,4,4-Tetrachloroazobenzene from 3,4-Dichloroaniline in Ontario Soils

Sprott, G.D.; Corke, C.T.; University of Guelph, Ontario, Canada

Can. J. Microbiol., 17 (2), 1971, 235-240

HERBICIDES; SOIL MOISTURE; MICROORGANISMS; LOAM; CLAY; ANAEROBIC; TETRACHLOROAZOBENZENE; TCAB; DICHLOROANILINE; DCA; SOILS; DEGRADATION

The formation of tetrachloroazobenzene (TCAB) from dichloroaniline (DCA) in soils (loams and clays of pH 5-7.2) was primarily due to chemical mechanisms under anaerobic and water-saturated conditions, but about 25% of the loss was associated with microbial activity under aerobic and unsaturated conditions. Maximum conversion of DCA to TCAB was 4.8% under optimum conditions (25 degrees C soil temperature, and 500 microgram DCA/g of soil); evidence is presented on the non-biological degradation of the condensed molecule formed.

1010

Hygienic Criteria for Assessing the Extent of Soil Contamination with Pesticides

Spynu, E.I.; Molozhanova, L.G.; Stefanskii, K.S.

Gig Sanit. 35 (11), 1970, 79-82

BEET; POTATOES; CARROTS; TOMATOES; CAULIFLOWER; CUCUMBERS; DDT; SEVIN; WHEAT; GRASS; APPLES; SOILS; WATER; AIR; UPTAKE; PESTICIDES

1011

Studies on Microbial Degradation of Herbicides in Soil

Srirama, R.K.; Rangaswami, G.

Biochem. J., 128(1), 40; 1972

FUNGI; BACTERIA; HERBICIDES; MICROBIOLOGY; SOILS; DEGRADATION

1012

Effect of Soil Type and Irrigation Method on Lateral Movement of Cycloate

Stanger, C.E.; Department of Farm Crops, Oregon State University, Corvallis, Oregon

Weed Science, 19(6), 709-711; 1971

SOILS; LOAM; WATER; BARNYARD GRASS; LOAMY SAND; SILT LOAM; SILT; GRASS; SOIL MOISTURE; CYCLOATE; CARBAMATE; MOVEMENT; IRRIGATION; LOAM

In greenhouse experiments in which cycloate (S-ethyl-N-ethylthiocyclohexene carbamate) was applied by subsurface line injection, its lateral movement (as measured by its toxicity to barnyardgrass) in irrigated soil was greater in a loamy sand than in two silt loams. Movement was greatest when the soil was irrigated to near field capacity before injection but was not irrigated subsequently. Lateral movement was adequate with furrow irrigation after application, but the treated band of soil was displaced. Movement was inadeqate with sprinkler irrigation and subsurface irrigation. In a silt loam with furrow irrigation, cycloate was more effective when mixed mechanically with the soil than when injected. In a silt loam irrigated after injection, movement was greater after injection into moist soil than after injection into dry soil.

1013

Comparison of the Persistence and Vertical Movement of the Soil-Applied Herbicides Simazine and Bromacil

Stecko, V.; Dep. Plant Husb., Agric. Coll. Sweden, Uppsala

Part of Proc. 10th br. Weed Control Conf. (303-306); 1970

BIOASSAY; HERBICIDES; MOVEMENT; BROMACIL; SIMAZINE; PERSISTENCE; SOILS; SAND; CLAY

Bioassay showed that when the herbicides were applied to the soil surface, downward movement of bromacil was more rapid than that of simazine. Bromacil persisted longer in sandy soil than in clay soil, whereas simazine persisted longer in clay soil. Simazine persisted longer in the top layer than it did lower down, whereas bromacil persisted longer lower down.

1014

Residues of DDT and DDE in Soil from Norwegian Chemicals by Soil Organic Matter Preparations

Sternersen, J.; Friestad, H.O.; Univ. Birmingham, England

Part of Proc. 10th br. Weed Control Conf. 3, (1089-1100); 1969

ORGANIC MATTER; DDT; DDE; ORGANIC CHEMICALS; ABSORPTION; SLURRY METHOD; GEL FILTRATION; FILTRATION; SOILS; CALORIMETRY; FILTRATION; HUMIC ACID; TRIAZINE

The isolation of organic matter and methods for studying interactions in aqueous solutions between components and organic chemicals are described. The techniques used to study absorption included the slurry method, gel filtration, pressure filtration and calorimetry and were illustrated by interactions between s-triazine herbicides and humic acid preparations.

1015

Residues of DDT and DDE in Soil from Norwegian Fruit Orchards

Stersen, J.; Friestad, H.O.

Acta Agr. Scand., 19(4), 1969, 241-244

FRUITS; SOILS; RESIDUES; DDT; DDE; FRUIT ORCHARDS

1016

Monitoring Pesticides in Soils from Areas of Regular Limited and No Pesticide Use

Stevens, L.J.; Collier, C.W.; Woodham, D.W.

Pestic. Monit. J., 4 (3), 1970, 145-166

DDT; DIELDRIN; PESTICIDES; SOILS; MONITERING

1017

Organic Matter Reactions Involving Herbicides in Soil

Stevenson, F.J.; Dep. Agron., Univ. Illinois, Urbana, Ill.

J. Environ. Qual.(JEVQAA) 1972, 1(4), 333-43; 1972

REVIEW; HERBICIDES; SOILS; HUMUS; ORGANIC MATTER; HUMIC ACID; ADSORPTION MECHANISMS; ADSORPTION; TRANSFORMATION

A review with 69 references on those aspects of humus synthesis and humic acid chemistry which are involved in the interactions between herbicides and soil organic matter. Mechanisms for adsorption and possible chemical transformation of herbicides by organic soil matter, are discussed.

1018

Role and Function of Humus in Soil with Emphasis on Adsorption of Herbicides and Chelation of Micronutrients

Stevenson, F.J.; Dep. Agron., Univ. Illinois, Urbana, Ill.

Bioscience(BISNAS), 22 (11), 643-650; 1972

REVIEW; HUMUS; HERBICIDES; MICRONUTRIENTS; CHELATION; SORPTION; SOILS; ADSORPTION; SAND; SILT; CLAY; PLANTS; ROOTS

Humus, representing less than 5% of the dry weight of soil, imparts unique and remarkable properties to the inorganic matrix of sand, silt, and clay. It is a positive asset in crop production. In addition to its well-known effects on physical, chemical and biological processes in soil, humus plays a key role in the behavior of pesticides and the solution and transport of micronutrients to plant roots. Interaction of humus with organic pesticides and other potentially toxic pollutants and complexation of transitional metal ions, particularly those essential for plant growth are discussed.

1019

Long-Term Persistence of BHC, DDT, and Chlordane in a Sandy Loam Soil

Stewart, D.K.R.; Chisholm, D.; Res. Stn., Canada Dep. Agric., Kentville, Nova Scotia, Canada

Can. J. Soil Sci.(CJSSAR) 1971, 51(3), 379-383; 1971

INSECTICIDES; PERSISTENCE; SOILS; BHC; DDT; CHLORDANE; RESIDUES; TRANSPORT; LOAM; SANDY LOAM; DDE

Residues of technical BHC, DDT and Chlordane present in a sandy loam soil 15 years after the last application were 7.5, 55 and 16% respectively of the amounts applied. The BHC residues consisted of alpha-, beta-, gamma-, delta-isomers at relative percentages of 36, 36, 16 and 12, respectively. The beta isomer was the most persistent. DDT residues consisted chiefly of p,p'-DDT and o,p'-DDT and of p,p'-DDE. Residues in chlordane-treated plots were principally alpha- and gamma-chlordane. There was little downward or lateral movement of these insecticides in the soil in 15 years.

1020

Long Term Persistence of Parathion in Soil

Stewart, D.K.R.; Chisholm, D.; Ragab, M.T.H.; Res. Stn, Canada Dep. Agric., Kentville, Nova Scotia, Canada

Nature, Lond., 229, 47; 1970

PARATHION; LOAM; MOVEMENT; SOILS; SAND; PERSISTENCE

Parathion at 31.4 lb per acre (15.7 ppm) was applied annually in spring to a sandy loam soil in 1949-1953. During 1949-1969 there was little downward movement of parathion. There was a small amount of lateral movement, probably as a result of cultivation. About 0.1% of the total parathion applied remained in 1969.

1021

The Influence of 5,Bromo-3 Secondary Butyl-6-Methyl Uracil on the Nitrifying and Respiratory Capacities of Soil

Steyn, P.L.;Wolff, S.W.

Phytophylactica, 1 (3-4), 1969, 157-159

MICROFLORA; HERBICIDES; FLORA; RESPIRATION; SOILS; URACIL

1022

Persistence of Aldrin, Dieldrin, Heptachlor, Lindane, and Crude BHC Hexachloracyclohexane' Formulations in Four Queensland Soils

Stickley, B.D.A.

Bur. Sugar Ex Sta., Queensl., Tech. Commun., 1, 36; 1972

PERSISTENCE; BHC; LINDANE; DIELDRIN; LIME; CYCLODIENE; ALDRIN; HEPTACHLOR; SOILS; RESIDUES; INSECTICIDES; EPOXIDE

As shown in field experiments the persistence of gamma-BHC in the soil increased, as the percentage of this isomer in the crude BHC formulations, applied to the soil, decreased, with gamma-BHC from the lindane treatments being the least persistent. Purealpha-BHC, Beta-BHC, delta-BHC, and dieldrin did not affect the persistence of the gamma-BHC, suggesting that the high persistence is due to the presence of some other compounds in crude BHC. Lime had no effect on the persistence of gamma-BHC. Out of 3 cyclodiene insecticides, dieldrin was by far the most persistent. Aldrin and heptachlor were epoxidized to dieldrin and heptachlor epoxide, respectively in the soils, and residues, 43 months after the application of the insecticides, consist almost entirely of the epoxides.

1023

Edaphic Aspects of the Disposal of Unused Pesticides, Pesticide Wastes, and Pesticide Containers

Stojanovic, B.J.; Kennedy, M.V.; Shuman, F.L.; Mississippi State Univ., State College, Miss.

J. Environ. Qual.(JEVQAA) 1972, 1(1), 54-62; 1972

PESTICIDES; BIODEGRADATION; SOILS; BACTERIA; DISPOSAL; LOAM; CALCAREOUS LOAM; MICROFLORA; PARAQUAT; DIELDRIN; PICLORAM; VERNOLATE; BROMINE; ZINC; ARSENIC

Complete biodegradation of all pesticides does not occur in the soil. The biodegradation and the effects in the soil microflora of 20 analytical grade and formulated pesticides, and 7 formulations mixtures were studied in a calcareous loam. The soil was amended with 11,227 kg/ha of the respective active ingredient (S), and was subsequently incubated for 56 days. The extent of biodegradation was estimated from the CO2 evolved during the incubation, and the effects on the microbial populations were determined. From plate counts of the incubated samples. Picloram, paraquat, Vernolate, and Dieldrin, as well as 8 of the formulations, were partly degraded. Single pesticides inhibited bacterial growth, but effected streptomyces and fungi much less drastically. Mixtures of formulations were more biodegradable than the single pesticides, provided that at least 1 or 2 pesticides in the mixture. Were relatively rapidly biodegraded. The mixtures reduced the number of bacteria, but favored growth of streptomyces and fungi. Incineration of liquid formulations at 900 degrees produced little ash. The incineration of solids, however, yielded substantial amounts of incombustible residues. Analysis of the ash from the solid indicated in several cases the presence of toxic elements, such as Br, As, Zn, etc.

1024

Microbial Versus Chemical Degradation of Malathion in Soil

Stojanovic, B.J.; Walker, W.W.; Gulf Coast Research Lab., E. Beach, Ocean Springs, MS 39564

Journal of Environmental Quality, 2(2), 229-232; 1973, April - June

INSECTICIDES; MALATHION; BIODEGRADATION; CLAY; MICROORGANISMS; DEGRADATION; SOILS; LOAM; PH; ABATEMENT; MICROFLORA; DISSIPATION; ORGANIC MATTER; HYDROLYSIS

Chemical and microbiological degradation of malation was studied in 3 Mississippi soils (Trinity loam, Freestone sandy loam, and Okolona clay) and their aqueous dilutions. Malathion abatement in all cases was more rapid under nonsterile than under sterile conditions, indicating the involvement of the soil microflora in malathion dissipation. Malathion disappearance under sterile conditions was interpreted as chemical degradation. The magnitude of microbial as compared to chemical degradation seemed to increase with increasing soil organic matter and was directly dependent on soil pH. Microbiological degradation predominated in all 3 tests and their aqueous dilutions. The greatest amount of chemical degradation occurred in Okolona clay. Malathion was quite stable under neutral or acid pH conditions, but was susceptible to hydrolysis in the alkaline pH range.

1025

Environmental Indicators for Pesticides

Strickland, J.; Blue, T.; Stanford Research Inst., Menlo Park, CA 94025

Final Rept., Stanford Research Institute; Proj. SRI-ECU-1608; Contract EQC-217; Apr 72, 129

1026

2-Aryl-3-(Alkylamino)Acrylonitriles as Fungicides

Strong, J.G.

U.S. (USXXAM) 3696199 (424/304; a 01N), 25 September, 1970, 6; 1972

ACRYLONITRILE; SOILS; FUNGICIDES

1027

Influence of Soil Physico-Chemical Characteristics on the Efficacy of Herbicide Pentachlorophenol

Su, Y.H.; Lin, H.C.

Journal of the Chinese Agricultural Chemical Society, 8, 99-104; 1970

ADSORPTION; PCP; SOILS; ORGANIC MATTER; PH; HERBICIDES; PENTACHLOROPHENOL

Adsorption of PCP increased with increasing soil organic matter content, soil surface area and acidity.

1028

Countermeasures to Pesticides Residue Problems Taken in Fukushima Prefecture

Suenaga, H.; Fukushima Agric. Exp. Stn., Koriyama, Japan

Shokubutsu Boeki (SHBOAO), 27(10), 418-420; 1973

ALDRIN; SOILS; RESIDUES; PESTICIDES; AERATION; PH; COMPOST

The aldrin level of soils was lowered by aeration, by adjustment of soil pH to 5.0, and by addition of compost.

1029

Persistence and Degradation of Chlorfenvinphos, Diazinon, Fonofos and Phorate in Soils and Their Uptake by Carrots

Suett, D.L.; Natn. Veg. Res. Stn, Wellesbourne, England

Pestic. Sci., 2, 105-112; 1971

PERSISTENCE; CHLORFENVINPHOS; DIAZINON; FONOFOS; PHORATE; SOILS; UPTAKE; CARROTS; INSECTICIDES; LOAM; DEGRADATION; PLANTS; PEAT; SAND; RESIDUES

The insecticides applied at 2 kg/ha persisted longer in peaty loam than in sandy loam. After 7 months the sandy loam containd 1% of the applied diazinon and 20-30% of the chlorfenvinphos, fonofos and phorate. The residues in peaty loam were 10, 40-50, 40-50 and 30-40%, respectively. Carrots harvested 26 weeks after sowing contained less than 0.2 ppm of all insecticides.

1030

Degradation of 3-(3',5'-dichlorophenyl) 5,5-dimethyloxazolidine-2,4-dione by Plants

Sumida, S.; Yoshihara, R.; Miyamoto, J.; Res. Dept. Pestic. Div., Sumitomo Chemical Co., Ltd., Hyogo-ken, Japan

Agr. Biol. Chem., 37(12), 2781-2790; 1973

DEGRADATION; PLANTS; SOILS; UPTAKE; METABOLISM; BEANS; GRAPES; PLANTS; ROOTS; LEAF TISSUES; MOVEMENT; DDOD; HDA; DHCA; XENON LAMP; RADIOTRACERS; CARBON 14

Studies on uptake, tissue distribution, and metabolism of 3-(3',5'dichlorophenyl)-5,5-dimethyl oxazolidine-2,4-dione (DDOD) by bean and grape plants, and degradation by soil and light were carried out using C-14 or 3H-DDOD. DDOD injected at stem or absorbed through roots of bean plants was transported mainly to leaf tissues. No downward movement of the label was observed. DDOD was decomposed in the nutrient solution to N-3,5-dichlorophenyl-N-alpha-hydroxyisobutyl carbamic acid (DHCA) and alpha-hydroxyisobutyl-3,5-dichloroanilide (HDA). Metabolism of DDOD in bean plants or on grape berries themselves occurred to only a small extent if at all. When injected into grape trees, DDOD underwent some degree of metabolization to HDA and probably 3-(3',5'-dichloro-4'-hydroxyphenyl)-5,5dimethyloxazolidine-2,4-dione. In soil, DDOD broke down to DHCA, HDA, and 3,5-dichloroaniline, but formation of tetrachloroazobenzene was not observed under the present experimental conditions. DDOD decomposed to some degree when irradiated with a xenon lamp.

1031

Volatilization, Degradation, Adsorption, and Desorption Characteristics of Aldicarb (2-Methyl-2-(Methylthio) Propionaldehyde O-(Methylcarbamoyl) Oxime) in Soils and Clays

Supak, J.R.: Texas A And M Univ., College Station, Tex.

Univ. Microfilms, Ann Arbor, Mich., Order No. 72-24,336, Diss. Abstr. Int. B., 1972, 33(3), 982; 1972

ALDICARB; SOILS; CLAY; OXIME; PESTICIDES; DEGRADATION; VOLATILIZATION; ADSORPTION; DESORPTION

1032

Decomposition of Herbicides in Different Soils, Following Repeated and Combined Application.

Suss, A.: Landanst. Pflbau, Munchen, German Federal Republic

Bayer. landw. Jb., 47, 425-445; 1970

SORPTION; DECOMPOSITION; HERBICIDES; SOILS; SOIL MOISTURE; TEMPERATURE; MONOLINURON; TRIAZINE; PYRAZON; TRIAZINE; SIMAZINE; ARESIN; PSYRAMIN; CLAY; ORGANIC MATTER; MICROORGANISMS

The 14C-labelled herbicides were applied to different soils (pH 6.4, 6.54 and 7.49; sorption values of 72.6, 78.1 and 94.6%) in the laboratory. Decomposition (during 52 weeks) mainly depended on soil moisture and temperature, and was highest at 30% of field capacity and at 30 degrees C (with monolinuron and triazine) or 15 degrees C (pyrazon). Repeated application of the same herbicide generally increased the rate of decomposition, while combined application with triazine (simazine) promoted the decomposition of monolinuron (Aresin) and pyrazon (Pyramin). Microbial decomposition of the herbicides was much affected by sorption on soil clay and organic matter, and generally resulted in a progressive decrease in the CO2 production during the first few weeks.

1033

Behaviour of Sorbed Herbicides in Soil, and Their Availability to Plants

Suss, A.; Eben, C.; Siegmund, H.; Landesanstalt fur Pflanzenbau, Munchen, German Federal Republic

Sonderheft Zeitschrift fur Pflanzenkrankheiten (Pflanzenpatholcgie) und Pflanzenschutz, 6, 65-74; 1972

MONOLINURON; SOILS; DEGRADATION; ORGANIC MATTER; PEAT; SIMAZINE; MUSTARD; UPTAKE; AVAILABILITY; MICROORGANISMS; PLANTS; HERBICIDES

Monolinuron adsorbed by samples of different soils (pH 6.40-7.49, clay contents 12.68-17.30%, base saturation 72.64-94.62%) underwent more rapid degradation than the Carbon-14-labelled herbicide applied in solution at the start of the experiment. Simazine adsorbed by organic matter (peat) was very rapidly decomposed. Mustard took up considerably less herbicide than the amount decomposed by micro-organisms, the uptake within 24 hours amounting to about 6% of the adsorbed herbicide.

1034

Reactions of Herbicides with Soil and Plants

Suss, A.; Siegmund, H.; Eben, C.; Grampp, B.; Bayerische Landesanstalt fur Bodenkultur, Pflanzenbau und Pflanzenschutz, Munich, Federal Republic of Germany

Part of Radiotraces Studies of Chemical Residues in Food and Agriculture, Proceedings of Combined Panel and Research Coordination Meeting, Vienna, October 25-29, 1971, sponsored by the Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture, IAEA-PL. 496/16; 1971

HERBICIDES; MONOLINURON; PYRAZON; SIMAZINE; PLANTS; DEGRADATION; 4-CHLOROANILINES; METABOLITES; MUSTARD; AVAILABILITY; UPTAKE; SOILS; DECOMPOSITION; CHLOROANILINE; SOIL MOISTURE

C14-labelled herbicides (monolinuron, pyrazon and simazine) were used for studies of their behavior in soil and plants. The degradation of these herbicides depends on soil activities. In three tested soils simazine was quickly decomposed during the first 10 weeks and decreased steadily. Pyrazon degradation was initiated after 10 weeks, while most of the monolinuron was degraded after 20 weeks. BACILLUS SPHAERICUS, isolated from treated soil, was found to be responsible for the breakdown. 4-chloroaniline was proved as one of the main metabolites. Mustard plants take up about 6% of the soil adsorbed monolinuron. The availability of the adsorbed monolinuron depends on the water content. The highest uptake was found at a water capacity in the soil of 60%.

1035

Reactions of Herbicides with Soil and Plants

Suss, A.; Siegmund, H.; Eben, C.; Grampp, B.; Bayer, Landsanst. Bodenkult., Munich, Germany

Radiotracer Stud. Chem. Residues Food Agr., Proc. Comb. Panel Res. Coord. Meet. (DAMMYC), 111-121; 1972

HERBICIDES; DEGRADATION; SOILS; MONOLINURON; PYRAZON; SIMAZINE; TRACER; METABOLITES; 4-CHLOROANILINE; MUSTARD; UPTAKE; WATER; AVAILABILITY

The degradation of 14C-labeled monolinuron, pyrazon, and simazine depended upon soil activities. In 3 tested soils, simazine was quickly decomposed during the first 10 weeks, but pyrazon degradation was initiated after 10 weeks, and most of the monolinuron was degraded after 20 weeks. The bacteria, bactillus sphaericus, isolated from treated soil, was responsible for the degradation, and 4-chloroaniline was 1 of the major metabolites. Mustard plants took up 6% of the soil-adsorbed monolinuron, but the monolinuron availability depended on the water content with a maximum availability at a water capacity of 60%.

1036

Translocation of Soil-Residual Organchlorine Pesticides into Vegetables

Suzuki, M.; Yamato, Y.; Kitakyushu Munic. Inst. Public Health, Kitakyushu, Japan

Shokuhin Eiseigaku Zasshi (SKEZAP), 14(2), 160-7; 1973

INSECTICIDES; RESIDUES; CROPS; SOILS; LINDANE; DDT; UPTAKE; CROPS; CARROTS; TURNIPS; SPINACH; RADISHES; CABBAGE; TOMATOES; CUCUMBERS; ENDRIN; ALDRIN; DIELDRIN; BHC; DDD; DDT

The uptake of alpha BHC, beta BHC, gamma BHC, and delta BHC from soil was higher by carrots, turnip, spinach, and radish than by cabbage and tomatoes. The uptake of an aldrin-dieldrin mixture wav 16.6, 9.6, and 4.4% by cucumbers, carrots, and spinach, respectively whereas the uptake of endrin was 21.8, 14.5, and 9.1% by cucumbers, cabbage and radishes, respectively although there were high levels of p,p'-DDT p'-DDT, p,p'-DDD, and p,p'-DDE in the soil, only trace amounts were found in the test crops.

1037

Multiple Organochlorine Pesticide Residues in Japan

Suzuki, M.; Yamato, Y.; Watanabe, T.; Kitakyushu Munic. Inst. Public Health, Kitakyushu, Japan

Bull. Environ. Contam. Toxicol. (BECTA6), 10(3), 145-150; 1973

PESTICIDES; RESIDUES; SOILS; ORGANOCHLORINE PESTICIDES; DDT; BHC; ISOMERS; ALDRIN; DIELDRIN; ENDRIN; DDE; DDD; FOOD

Many organochlorine pesticide residues were detected in the agricultural soil of a region in japan that has been treated with large amounts of pesticides. The soil contained high residual levels of DDT and its related compounds, several isomers of BHC, aldrin, dieldrin, and endrin. Since these soil pesticides can enter food sources by many routes, they represent a serious environmental hazard.

1038

Trifluralin Vapor Emission from Soil

Swann, C.W.; Behrens, R.; Dep. Agron. Plant Genet., Univ. Minnesota, St. Paul, Minn.

Weed Sci. (WEESA6), 20(2), 143-145; 1972

TRIFLURALIN; VAPORIZATION; SOILS; HERBICIDES; VOLATILIZATION

When applied to soil, trifluralin lost less than 5% of its initial amount by volatilization during the first 12 hours during the first 2 hours the vapor loss from 4.48 kg trifluralin/ha was only 3.5 times that shown at 0.56 kg trifluralin/ha. Increasing the spray volume from 2.34 to 300 kl/ha reduced the rate of trifluralin vaporization loss by 50%. The experiments were carried out on 2 soil types.

1039

Phytotoxicity of Trifluralin Vapors from Soil

Swann, C.W.; Behrens, R.R.; Dep. Agron. Plant Genet., Univ. Minnesota, St. Paul, Minn.

Weed Sci. (WEESA6)| 20(2), 143-146; 1972

TRIFLURALIN; VAPOR; SOILS; FOXTAIL MILLET; PLANTS; PROSO MILLET; MILLET; ROOTS

The growth of foxtail roots and shoots was inhibited by trifluralin, when exposed selectively to trifluralin vapors arising from soil. Suppression of root and shoot growth increased as trifluralin application rates increased. In shoot exposure, vapors arising from soil treated with 5 ppm trifluralin were lethal to seedlings of both species. In root exposure, root growth of both species was severly suppressed at 20 ppm trifluralin but shoot growth was unaffected. The phytotoxic effects resulting from a given concentration of trifluralin were more severe as greater carrier volumes were used for application. Trifluralin vapors arising from soil 16-22 days after treatment were still sufficient to cause shoot growth inhibition.

1040

Predicition of Atrazine Distribution and Movement in Soil Systems

Swanson, R.A.; Univ. Arizona, Tucson, Ariz.

Univ. Microfilms, Ann Arbor, Mich., Order No. 72-22,627, Diss. Abstr. Int. B., 1972, 33(2), 527; 1972

ATRAZINE; DISTRIBUTION; SOILS; TRANSLOCATION; MOVEMENT

1041

Chemical and Physical Processes that Affect Atrazine and Distribution in Soil Systems

Swanson, R.A.; Dutt, G.R.; Arizona Agricultural Experiment Station, University of Arizona, Tucson, Arizona

Soil Sci. Soc. Amer., Proc. (SSSAA8), 37(6), 872-876; 1973

ATRAZINE; ADSORPTION; DESORPTION; SOILS; FREUNDLICH EQUATION; MODEL; MATHEMATICAL MODEL; DISTRIBUTION

Both the adsorption and desorption isotherms for atrazine in soil fit the Freundlich equation, although the desorption isotherm followed a different path back to the starting point. This hysteresis effect indicated that the adsorption and desorption of atrazine by soils were irreversible processes. The presence of calcium, magnesium, or sodium ions had little effect on atrazine adsorption and desorption, but the solubility of atrazine was exponentially related to the ionic strength of the solution. By using the equation developed, a computer model for prediction of the distribution and movement of atrazine in soil was prepared.

1042
Movement of Parathion in Soil Columns

Swoboda, A.R.; Thomas, G.W.

J. Agr. Food Chem., 923-7; 1968

MOVEMENT; PARATHION; SOILS; MOVEMENT

1043
Distribution of DDT and Toxaphene in Houston Black Clay on Three Watersheds

Swoboda, A.R.; Thomas, G.W.; Cady, F.B.; Baird, R.W.; Knisel, W.G.

Environ. Sci. Technol., 5(2), 1971, 141-145

INSECTICIDES; MOVEMENT, LEACHING; DDT; CLAY; BLACK CLAY; TOXAPHENE

1044
Mechanism of BHC Pollution

Tachikawa, R.

Sci. Ashai, 30(12), 45-51; 1970

BENZENE HEXACHLORIDE; WATER; FRESHWATER; SEA; ANIMALS; RIVERS; DIET; INSECTICIDES; SOILS; ADSORPTION; RESIDUES; RAINFALL

In Japan, benzene hexachloride, BHC, is used as an insecticide. Beta-BHC has a higher toxicity level than alpha-BHC, is less soluble in water, and is more persistent, therefore, more alpha-BHC is used in western Japan. Because BHC is so widely used there is very little fresh water which is unpolluted since the agricultural waters on which BHC is used flow into the rivers and the sea. BHC condenses in living animals because of their contact with the soil and water. The residue concentration in water is low but, nevertheless, it is adsorbed by the surface layer of soil and when it rains it is dissolved by the water and readsorbed by the plants. Uv-rays break down gaseous BHC which enters the atmosphere but re-enters the cycle through the rain. The amount of BHC varies with the seasons ranging from 0.1 ppb in the inland sea to 144 ppt in Yokohama City. Beef and dairy products contribute a large amout of BHC in the diet; for adults 0.6 mg per person is an allowable limit. The use of the BHC and DDT decreased but other insecticides are expensive, therefore, other safer agricultural chemicals must be developed and the old ones improved upon.

1045
Fate of Pesticides in Environment

Tahori, A.S.; Israel Inst. for Biol. Res., Ness-Ziona, Israel

Gordon and Breach Science Publishers, New York-London-Paris, 572 p.; 1972

FATE; PESTICIDES; SOILS; METABOLISM; ORGANOPHOSPHORUS; FUNGICIDES; FOOD CHAINS; BIOCHEMISTRY; RESIDUES; MAMMALIAN TOXICOLOGY; ORGANOCHLORINE; CARBAMATES; TRACER; MAMMALIAN PHARMACOLOGY; REVIEW

Fate of Pesticides in Environment is volume six in the series Pesticide Chemistry representing the proceedings of the Second International Congress on Pesticide Chemistry of the International Union for Pure and Applied Chemistry (IUPAC), held at Tel Aviv, Israel, February 22-26, 1971. The congress was attended by over 700 scientists representing 35 countries. The current volume contains papers and recommendations from workshop sessions on: factors influencing the fate of pesticides in soils; chemistry and metabolism of terminal residues of organochlorine, organophosphorus, and carbamate compounds, as well as fungicides; and the use of radioactive tracers for the study of fate of pesticide residues in food chains. Also included are papers from symposia on interpretation of basic chemical and toxicological data involved in development of pesticide residue tolerances and biochemistry of pesticides in relation to mammalian toxicology and pharmacology.

1046
Pollution and the Purifying Action of Soil. 3. Pollution by Agricultural Chemicals

Takahashi, K.; Hyg. Res. Lab. Kanagawa Prefect., Japan

Mizu Shori Gijutsu (MSYGAO), 13(6), 1-10; 1972

REVIEW; INSECTICIDES; SOILS

1047
Results of Investigation of Organocholorine Pesticide Residues in Soils Where Vegetables are Grown

Takaruma, S.; Wada, T.

Kanto Tosan Byogaichu Kenkyukai Nenpo Proc., 19, 124-125; 1972

ORGANOCHLORINE PESTICIDES; RESIDUES; VEGETABLES; RICE; BHC; ENDRIN; CARBON; PH; HUMUS; HUMIC ACID; PESTICIDES; DIELDRIN

Results of investigations in 1970 of organochlorine pesicide residues in 32 soil specimens in vegetable fields in nagano prefecture are reported. The sampling and analysis of the soil specimens were carried out with standard gas chromatography methods. Four vegetable fields where rice was grown previously for 4-5 years and four regular vegetable fields were used. The smaller the amount of application the smaller the residue. In the converted fields the residue was relatively small despite the relatively large amounts of applied BHC. Endrin residues did not parallel the amount of the application. The correlation between the residues and pH and organic matters in the soil were higher for delta-BHC and dieldrin. The smaller residue of DDT was found in the soil with a high pH. The correlation between total carbon and the residues was high for alpha- and gamma-BHC. There was also a high correlation between humus and gamma-BHC and humic acid and gamma- and alpha-BHC.

1048

On the Fate of Disulfoton in the Paddy Field Soil

Takase, I.; Nakamura, H.; Kobayashi, M.; Tsuboi, A.; Wakabayashi, S.; Agr. Chem. Res. Inst., Nihon Tokushu-Noyaku Seizo Co. Ltd., Hino, Tokyo, Japan

Noyaku Kenkyu (Agr. Chem. Res.), 19(3), 58-64; 1973

ADSORPTION; SOILS; PADDIES; RICE; FATE; DISULFOTON; OXIDATION; HYDROLYSIS; PHOTODEGRADATION; EVAPORATION; METABOLITES; SULFOXIDE; HALF-LIFE

Experiments were carried out in pots of soil under flooded conditions and in paddy fields to study the fate of disulfoton, applied to soil. Residues of disulfoton in unpolished rice and rice straw harvested in the field were also determined. In the potted and flooded soil all the chemical from 4 mg of disulfoton applied as a diluted solution of 25% EC diminished quickly, the half-life at 25-30 C being about four days. A large part of disulfoton applied on the surface of flooded paddy fields diminished quickly through oxidation, hydrolyzation, photodegradation, and evaporation. Some disulfoton was adsorbed in the soil where it decomposed relatively slowly. Disulfoton was eventually oxidized in water and soil with time; the major oxidative metabolite detected was its sulfoxide. When 5% granular formulation was applied on the water surface of flooded paddy field at the rate of 6 kg/10 are, the chemical diminished quickly with a half-life of 3-4 days, and the major oxidized metabolite being the sulfoxide. In the unpolished rice harvested from the paddy field where disulfoton had been applied once at a rate of 6 kg of 5% granular formulation/10 are neither disulfoton nor its oxidative metabolites were detected 120-140 days after application. In rice straw simultaneously harvested about 0.25 ppm of oxidative metabolites were detected.

1049

Fate of Disyston Active Ingredient in Soil

Takase, I.; Tsuda, H.; Yoshimoto, Y.; Agric. Chem. Inst., Nihon Tokushu Noyaku Seizo K. K., Tokyo, Japan

Pflanzenschutz-Nachr. (Amer. Ed.) (PNBYAT), 25(1), 43-63; 1972

DI-SYSTON; DEGRADATION; SOILS; CLAY; LOAM; CLAY LOAM; SANDY LOAM; SAND; METABOLITES

Di-syston was rapidly converted to oxidative metabolites in upland soils 8(clay loam; sandy loam, and sandy soil); however, these metabolites were stable and still displayed insecticidal activity. In flooded soils d-syston oxidized at a faster rate than in upland soils. In sterilized soil di-syston degradation was very slight, which indicates the involvement of soil microorganisms. Di-syston moved above and below the soil layer to which it was applied.

1050

Fate of Disulfoton in Soil

Takase, I.; Tsuda, H.; Yoshimoto, Y.; Agric. Chem. Inst., Nihon Tokushu Noyaku Seizo Co. Ltd., Hino, Japan

Nippon Oyo Dobutsu Konchu Gakkai-Shi (NIPTAR), 15(2), 63-69; 1971

DISULFOTON; SOILS; PERSISTENCE; INSECTICIDES; PADDIES

Disulfoton persisted in field soils as disulfoton sulfoxide and disulfoton sulfone, both compounds retaining insecticidal activity. Only very low concentrations of o analogs of disulfoton were detected. The concentration of these analogs was somewhat higher in paddy soil than in upland soil. Oxidation of disulfoton is probably caused by soil microorganisms.

1051

The Fate of Ethylthiometon in Paddy Soil

Takeuchi, Y.; Konnai, M.; Takematsu, T.; Agr. Chem. Inst., Nihon Tokushu Noyaku Seizo Co., Ltd., Hino City, Tokyo, Japan

Nippon Nogei Kagaku Kaishi (J. Agr. Chem. Soc. Jap.), 48(1), 27-34; 1974

REDUCTION; DEGRADATION; SULFONE; OXIDATION; VOLCANIC ASH SOIL; ALLUVIAL SOIL; SOILS; PADDIES; SOIL MOISTURE; ETHYLTHIOMETON SULFOXIDE; HYDROLYSIS; HALF-LIFE; GLUCOSE; METABOLITES; ETHYLTHIOMETON; FLOODING; INSECTICIDES; ASH; FLOODED SOILS; THYLTHIOMETON SULTONE

When ethylthiometon was incubated in paddy soil under flooded conditions at 25-30 degrees C at a rate of 6 ppm based on dreid soil, it was rapidly oxidized to ethylthiometon sulfoxide. Further oxidation to the sulfone was slight. After 7-10 days of incubation the previously oxidized sulfoxide was gradually reduced to form the parent insecticide, ethylthiometon added initially. This reductive reaction occurred in volcanic ash soil and also in alluvial soil, but only under flooded conditions. When ethylthiometon sulfoxide was incubated in flooded soil, the reduced product, ethylthiometon, was detected in increasing amounts with the lapse of time; however, this phenomenon was not observed when thylthiometon sulfone was incubated. After addition of glucose to the soil, oxidation and reduction reactions occurred, but the insecticide was more likely to be hydrolyzed. The degradation of ethylthiometon was suppressed in sterilized soil as compared to unsterilized soil, but the sulfoxide was reduced to form ethylthiometon. The half life of ethylthiometon, including it five oxidative metabolites with insecticidal efficacy, appeared to be about 50 days in flooded paddy soil and 30-40 days in uplant soil. (18 references)

1052

Soil Factors Affecting the Herbicidal Activity of 3-(2-Methylphenoxy)Pyridazine(Credazine)

Takeuchi, Y.; Konnai, M.; Takematsu, T.; Weed Control Res. Inst., Utsunomiya Unniv., Utsunomiya, Japan

Zasso Kenkyu(ZASKAN) 1972, (14) 29-35; 1972

CREDAZINE; SOILS; HERBICIDES; HUMUS; CLAY; ADSORPTION

Adsorption of Credazine in soil was studied in a pot experiment with 4 soils containing 1.2-15.4% humus. the humus adsorbed credazine, and slackened its movement in the soil, irrespective of the soil moisture, thus stabilizing the herbicidal effect of credazine, and preventing crop injury from high credazine doses. Credazine was also adsorbed on clay, especially at lwoer pH.

1053
Dynamics of DDT and BHC Residues in Fodder Crop Soil

Talanov, G.A.; Kovaleva, Y.S.

Tr. Vses. Nauchno-Issled Inst. Vet. Sanit., 41, 1972, 182-187

BEETS; VETCH; OATS; CORN; POTATOES; SOILS; DDT; BHC; RESIDUES; CROPS; FODDER

1054
The Adsorption of Some S-Triazines in Soils

Talbert, R.E.; Fletchall, O.H.

Weed Sci., 13, 1965, 46; 1965

ADSORPTION; S-TRIAZINE; SOILS

1055
Effects of Activated Carbon on Fluometuron, Nitralin, and Trifluralin Activity in Soil

Talbert, R.E.; Kennedy, J.M.; Agron. Dep., Univ. Arkansas, Fayetteville, Ark.

Proc., S. Weed Sci. Soc.(SWSPBE), 25, 394-402; 1972

ACTIVATED CARBON; HERBICIDES; INACTIVATION; FLUOMETURON; NITRALIN; SOILS; PIGWEED; BIOASSAY; WHEAT STRAW; COTTON STALKS; TRIFLURALIN; COTTON; SAND; SILT LOAM; SILT; LOAM

As shown by the pigweed bioassay, activated carbon was greater than 100 times as effective as was wheat straw, and wheat straw was greater than 10 times as effective as were cotton stalks, in inactivating nitralin in sand cultures. In a silt loam soil, 0.177 ppm nitralin or 0.174 ppm trifluralin were inactivated by 100 ppm darco gfp carbon. In field experiments, 1 lb nitralin/acre and 1.5 lb fluometuron acre were completely inactivated by 500 lb carbon/acre, when the carbon and the herbicides were applied at the same time. The carbon was less effective when applied subsequent to the herbicides.

1056
Behavior of Amiben and Dinoben Derivatives in Arkansas Soils

Talbert, R.E.; Runyan, R.L.; Baker, H.R.

Weed Sci., 18(1), 10-15; 1970

HERBICIDES; SOILS; AMIBEN; DINOBEN

1057
Distribution of Lead Chelate in the Transpiration Stream of Higher Plants

Tanton, T.W.; Crowdy, S.H.

Pestic. Sci., 2(5), 211-13; 1971

REVIEW; EDTA; LEAD; CHELATION; PLANTS; LEAD CHELATE; STREAMS; FUNGICIDES

A reivew with 12 references on the use of 1:1 EDTA lead chelate as a free space marker in plants. The chelate can be used for the study of the transport of systemic fungicides.

1058
DDT Residues in Forest Floor and Soil After Aerial Spraying Oregon 1965-68

Tarrant, R.F.; Moore, D.G.; Bollen, W.B.; Loper, B.R.

Pestic. Monit. J., 6(1), 1972, 65-72

MICROORGANISMS; DDE; DDD; INSECTICIDES; FOREST SOILS; SOILS; AIR

1059
BHC Residues in the Environment

Tatsukawa, R.; Wakimoto, T.; Ogawa, T.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. Oiso, Japan, October, 1971. Illus. Maps. Academic Press: New York, NY; London, England, (p. 229-238); 1972

PLANTS; HUMANS; TISSUE; AIR; WATER; SOILS; BHC; RESIDUES

1060
Sample Errors in Measurements of the Persistence of Dieldrin in a Field Soil

Taylor, A.W.; Barrows, H.L.; Soil Water Conserv. Res. Div., Agric. Res. Serv., Beltsville, MD

Pesticide Chemistry Proceedings International Congress on Pesticide Chemistry, 4, 439-455; 1971

DIELDRIN; PERSISTENCE; SOILS; ORGANOPHOSPHORUS; PESTICIDES; PERSISTENCE; HEPTACHLOR; RATE OF LOSS

The loss of dieldrin from fields during the 4.5 years after spraying was 0.75 ppb per day from an initial concentrations of 3 ppm. The standard deviations for the 8 sections of the field were 30-70% about their mean. The mean did not show any regular decrease with time. In a detained sampling experiment of 108 core samples, the dieldrin content showed a 50-fold variation (range of 16-797 mg/m2, mean of 207 mg/m2). Statistical analysis confirmed that these variatins would account for the differences between the bulked samples taken from larger areas. The wide variability in the separate cores could be attributed to differences in spray coverage and irregularities due to poor mixing durin cultivation. Under these conditions coefficients of variation of soil dieldrin analysis could be decreased below 20% at practical sampling rates. The rate of loss of the less persistent heptachlor could be measured with much greater confidence.

1061
Organic Environmental Residues

Taylor, I.S.; Commonwealth Laboratory, Melbourne, Australia

Proc. Roy. Aust. Chem. Inst. (PAUCAZ), 39(12), 350-354; 1972

REVIEW; PESTICIDES; RESIDUES; ANALYSIS; ORGANIC CHEMICALS

1062
Decomposition of Sevin by a Soil Bacterium

Tewfik, M.S.; Hamdi, Y.A.

Acta Microbiol. Pol. Ser. B. Microbiol. Appl., 2(2), 133-135; 1970

DECOMPOSITION; SEVIN; SOILS; SOIL BACTERIA

1063
Accumulation and Distribution of Chlorinated Insecticides in Soil and their Effects on Plants

Thakre, S.K.; Dep. Agric. Chem. Soil Sci., Coll. Agric., Parbhani, India

Pesticides(PSTDAN), 7(5), 25-9; 1973

REVIEW; CHLORINATED INSECTICIDES; SOILS; ORGANOCHLORINE INSECTICIDES; PERSISTENCE; RESIDUES; DISTRIBUTION; ACCUMULATION; PLANTS

The persistence and distribution of insecticidal residues in soil, and the effects of chlorinated insecticides on plant growth are reviewed with 47 references.

1064
Persistence of Biological Activity of Seven Insecticides in Soil Assayed With FOLSOMIA CANDIDA

Thompson, A.R.; Canada Dep. Agric., London, Ontario, Canada

J. Econ. Entomol.(JEENAI), 66(4), 855-7; 1973

CHLORORGANIC; INSECTICIDES; PERSISTENCE; CARBAMATE; SOILS; SAND; BIOASSAY; ZINOPHOS; CARBOFURAN; DIAZINON; DIELDRIN; INSECTS; PHORATE; ISOBENZAN; CHLORPYRIFOS

The persistence of 7 insecticides in sand at temperatures of 13 degrees and 24 degrees was determined, using a bioassay with F. CANDIDA. at 13 degrees zinophos, carbofuran, diazinon, and dieldrin killed all insects up to 16 weeks after treatment of the soil with 0.05-0.5 ppm of each insecticide. Phorate activity lasted slightly more than 1 week, while isobenzan and chlorpyrifos were of intermediate persistence. At 24 degrees isobenzan persisted longer than at 13 degrees, and the persistence of phorate and dieldrin was unchanged. Zinophos, carbofuran, and chlorpyrifos were much less persistent at the higher temperature.

1065
Movement of Dieldrin through Soils. 2. In Sloping Troughs and Soil Columns

Thompson, A.R.; Edwards, C.A.; Edwards, M.J.; Rothamsted Exp. Stn, Harpenden, England

Pestic Sci., 1, 174-178; 1970

MOVEMENT; DIELDRIN; SOILS; SOIL COLUMNS; RUNOFF; LOAM; CLAY; PEAT; LEACHING; RAINFALL; MODEL ECOSYSTEM; SAND; CLAY LOAM; SANDY LOAM

Dieldrin at 22 kg/ha of active ingredient was applied to the surface of soil in the uppermost compartment of a glass-lined sloping trough with 6 compartments, each filled with soil to a height of 5 cm above the top of each vertical transverse partition. During the 17 weeks in which movement of dieldrin was studied, 19.5 cm of rain fell. less than 0.02% of the dieldrin appeared in the leachate and 99% of this amount was collected during the first 9 weeks, mainly from the uppermost compartment. Very little surface runoff of dieldrin occurred down the slope. In laboratory experiments in which dieldrin was applied to the top of disturbed and intact columns of sandy loam, but generally much less than 0.1% was leached through the columns. leaching of dieldrin through the columns decreased in the order heavy clay loam, peat, sandy loam, and 10 times as much dieldrin was leached through intact soil as through disturbed soil.

1066
Volatility of Technical Chlordane an Alternative Approach for Quantitative Measurement of Residues

Thompson, D.W.

J. Ass. Offic. Anal. Chem., 53(5), 1015-1017; 1970

PESTICIDES; VOLATILIZATION; CHLORDANE; RESIDUES

1067
2,4-D Metabolism Pathway of Degradation of Chlorocatechols by ARTHROBACTER Species

Tiedje, J.M1; Duxbury, J.M.; Alexander, M.; Dawson, J.

J. Agr. Food Chem., 17(5), 1021-1026; 1969

2,4-D; METABOLISM; DEGRADATION; CHLOROCATECHOLS

1068
Chemistry and Metabolism of Terminal Residues of Fungicides

Tietz, H.; Pflanzenschutz Atea Biol. Forsch., Farbenfabr. Bayer A.-G., Leverkusen, Germany

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAAY), 6, 347-366; 1972

REVIEW; FUNGICIDES; RESIDUES; METABOLISM; TERMINAL RESIDUES

A review with 62 references. The chemistry, metabolism, and methods of detection of fungicide terminal residues are discussed.

1069
The Pollution of the Soil by Insecticides

Tilemans E;

Ann. Gambloux, 77(3), 195-206; 1971

PLANTS; ORGANIC MATTER; ABSORPTION; EVAPORATION; SOILS; INSECTICIDES

1070
Decomposition of Herbicides and Insecticides in Soil (A Review of Literature)

Timar, M.

Agrokem. Talajt., 19, 357-365; 1970

SOILS; DECOMPOSITION; HERBICIDES; INSECTICIDES; REVIEW

A review with 63 references.

1071
An Enzyme Complex Capable of Degrading 2,4-D

Tomati, U.; Lippi, D.; Pietrosanti, W.; Inst. Chim. Pharm, Rome Univ., Italy

Meded. Rijksfac. Landbwet. Gent., 35, 829-838; 1970

ENZYME COMPLEX; SOILS; DEGRADATION; 2,4-D; PESTICIDES; MICROORGANISMS

The enzyme complex was extracted from a species of ARTHROBACTER isolated from soil.

1072
Microbial Conversion of Mercury Compounds

Tonomura, K.; Furukawa, K.; Yamada, M.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar., Oiso, Japan, October, 1971. Academic Press: New York, N.Y., U.S.A.; London, England. (p. 115-133) 637 p.

MICROBIOLOGY; MERCURY; CONVERSION

1073
Interaction of Herbicides and Soil Microorganisms

Torgeson, D.C.; Boyce Thompson Inst. for Plant Research

NY, Water Poll Cont Research Series 16060 DMF, EPA, USGPO, (73) special report; 1971, March

DEGRADATION; DCPA; SOILS; CULTURES; MICROFLORA; DECONTAMINATION

In pure cultures and in soils the addition of DCPA had little effect upon bacterial growth, and several microorganisms appeared to utilize-the-herbicide as a carbon source. Encouragement of the soil microflora by the addition of nutrient broths resulted in a reduction of toxicity to plants of a number of herbicides. The results indicate that the decontamination of soil by the degradative activities of the natural microflora may be accelerated by the addition of suitable nutrient sources.

1074
Effects of Mocap, N-Serve, Telone, and Vorlex at Two Temperatures on Populations and Activities of Microorganisms in Soil

Tu, C.M.; Res. Inst., Agric. Dep. Canada, London, Ontario, Canada

Can. J. Plant Sci. (CPLSAY), 53(2), 401-5; 1973

SOILS; FUMIGANTS; MICROORGANISMS; RESPIRATION; AMMONIFICATION; NITRIFICATION; FUNGUS; SULFUR; OXIDATION; LOAM; MOCAP; N-SERVE; TELONE; VORLEX; PEPTONE; INHIBITION; AMMONIUM SULFATE; GLUCOSE; INCUBATION; PESTICIDES; OXYGEN; NITROGEN; TEMPERATURE; BACTERIA; SANDY LOAM

As shown in the laboratory, 5 and 30 micrograms mocap 20 and 40 micrograms n-serve/g, 25 and 150 micrograms telone/g and 30 and 180 micrograms vorlex/g, did not suppress the bacteria populations in a sandy loam, at 5 or 28 degrees. At the high levels, the compounds decreased the fungal populations at 5 degrees, after 2 weeks. N-serve and telone stimulated ammonification of incorporated peptone, whereas vorlex had an inhibitory effect. Mocap and telone, at low levels, stimulated nitrification of the native organic nitrogen, after 2 weeks at 5 degrees. All the compounds inhibited the nitrification of (NH4)2SO4 and oxidation of elemental sulfur after 4 weeks at 28 degrees. Oxygen consumption increased with increasing concentrations of mocap. Simultaneous treatment with the pesticides and glucose, depressed respiration in the early stages of incubation. The effects of the pesticides on respiration showed that soil temperature was negatively correlated with incubation time in the early stages of the experiments.

1075
Bux Insecticide Soil Metabolism

Tucker, B.V.; Pack, D.E.; Orthor Div., Chevron Chem. Co., Richmond, Calif.

J. Agr. Food Chem. (JAFCAU), 20(2), 412-16; 1972

BUX; INSECTICIDES; HYDROLYSIS; SOILS; METHYLCARBAMATE; METABOLYSIS; CARBON 14; TRACER

Bux insecticide, a 3:1 mixture of M-(1-METHYLBUTYL)Phenyl methylcarbamte, was readily metabolized by soil organisms by attack at the carbamate ester linkage. Soils treated with the carbonyl- 14C-labeled constituents seperately evolved labeld carbon dioxide as the parent carbamate content decreased. Each parent carbamate formed only one labeled metabolite in the soil, M-(1-HYDROXY-1-METHYLBUTYL)Phenyl methylcarbamate and M-(1-HYDROXY-1-ETHYLPROPYL)Phenyl methylcarbamate, which were present only in trace amounts. M-(1-METHYLBUTYL)Phenyl n-hydroxy-n-methylcarbamate, m-(1-HYDROXY-1-METHYLBUTYL)Phenyl methylcarbamate, P-hydroxy-m-(1-METHYLBUTYLY)Phenyl methylcarbamate, M-(1-METHYLBUTYL)Phenyl n-hydroxymethylcarbamate, M-(2-HYDROXY-1-METHYLBUTYL_Phenyl methylcarbamate, and M-(3-HYDROXY-1-METHYLBUTYL)Phenyl methylcarbamate were prepared to aid metabolite identification.

1076

Movement and Degradation of Herbicides in Florida Citrus Soil

Tucker, D.P.; Phillips, R.L.; Department of Fruit Crops, University of Florida, Gainesville, FL

Citrus Industry, 51(3), 11-13; 1970

RESIDUES; DISTRIBUTION; MOVEMENT; TERBACIL; BROMACIL; DICHLOBENIL; TRIFLURALIN; SOILS; HERBICIDES; DISPERSION; DEGRADATION; CITRUS

The distribution of terbacil, bromacil, dichlobenil and trifluralin in citrus soils which had been treated with these herbicides for up to 5 years was studied. Terbacil and bromacil rapidly disappeared from the top 18 inches of soil, but were found throughout the 18 inch layer of soil. Only trace concentrations of residual dichlobenil and trace amounts or no residues of trifluralin were found in the top 18 inches. The means of dispersion and degradation are discussed.

1077

Effect of Chemical Agents Applied in Combatting After-Snow Slipperiness of Roads on the Greenery Soil in Lublin

Turski, R.; Flis-Bujak, M.; Misztal, M.; Inst. Glebozn. Chem. Roln. Wydz. Roln., Akad. Roln., Lublin, Poland

Ann. Univ. Maria Curie-Sklodowska, Sect. E (ACEAA2), 27, 89-105; 1972

ROADSIDE SOIL; CHLORIDE; LEAD; COPPER; CATION; SOILS; SNOW; LUBLIN

1078

Possibilities of Binding Herbicides of Triazine Derivates by Humic Acids

Turski, R.; Steinbrich, A.; Inst. Soil. Sci. Agric. Chem., Coll. Agric., Lublin, Poland

Pol. J. Soil Sci.(PJSOBN) 1972, 4(2), 119-24; 1972

HERBICIDE; SORPTION; HUMIC ACID; CARBOXYL GROUP; HUMATE; TRIAZINE; ACIDS; HYDROXYL

1079

Metabolism of 3-(p-bromophenyl)-1-methoxy-1-methyl urea (Metobromuron) by Selected Soil Microorganisms.

Tweedy, B.G.; Loeppky, C.; Ross, J.A.; Missouri University, Columbia, MO

J. Agric. Fd. Chem. 18, 851-853; 1970

METABOLISM; METOBROMURON; DEGRADATION; 3-(P-BROMOPHENYL)-1-METHOXY-1-METHYLUREA; MICROORGANISMS; HERBICIDES; SOILS; BROMOANILINE; ACETANILIDE; METABOLITES; DEGRADATION PRODUCTS

Degradation of the herbicide by TALAROMYCES WORTMANII, FUSARIUM OXYSPORUM, CHLORELLA VULGARIS and BACILLUS sp., after 18 days incubation was 37%, 11%, 1% and 1%, respectively. All micro-organisms rapidly converted p-bromoaniline (an intermediate in the degradation process) to p-acetanilide.

1080

Biodegradation of Pesticides by Microorganisms. 2. Factors Affecting the Absorption of BHC Isomers by Fungal Mycelium

Ueyama, A.; Egawa, H.; Masuko, M.; Shikata, H.; Pestic. Res. Inst., Kyoto Univ., Kyoto, Japan

Nippon Kingakkai Kaiho(NGKKAT), 12(2), 103-7; 1971

BHC; ABSORPTION; FUNGI; INSECTICIDES; SOILS;

It has been suggested that the persistence of BHC in soils may be caused by fungal absorption. The absorption of the alpha, beta, gamma, and delta isomers by FUSARIUM ROSEUM was 0.044, 0.080, 0.88, and 0.095 micro/mg fresh mycelium for 500 mg mycelium, respectively. Thus, the amount absorbed is not proportional to the mycelial weights, and the gamma and delta isomers were absorbed in larger quantities than the alpha and beta isomers. The maximum absorption level of F. ROSEUM during successive treatments with media counting consistant concentrations of gamma-BHC was 0.54 micro/mg fresh weight. The absorption of gamma-BHC by COCHLIOBOLUS MIYABEANUS in media containing 115-92,080 ng/4 ml was maximum 1028 ng/mg mycelial weight, indicating that it can be absorbed up to a level of 0.1% of the mycelial weight changes in culture conditions 2(light/dark, shaking/stationary) had variable effects on gamma-BHC absorption by C. MIYABEANUS.

1081

Fate of Amiprophos in Soil

Ueyama, I.; Takase, I.; Tomizawa, C.; Nihon Tokushu Noyaku Seizo Co., Tokyo, Japan

Zasso Kenkyu(ZASKAN), (15), 28-34; 1973

AMIPROPHOS; PERSISTENCE; SOILS; DEGRADATION; INSECTICIDES; TRANSFORMATION

1082

Detoxification and Translocation of the Herbicide KHIB5 in Soil

Umarov, A.A.; Ioi, N.F.; Tsoi, Z.I.; Inst. Khim. Rastit. Veshch., Tashkent, USSR

Khim. Sol. Khoz.(KSKZAN), 11(7), 545-7; 1973

KHIB5; SOILS; HERBICIDES; DETOXIFICATION; BENZIMIDAZOLE; COTTON; WEEDS; ANNUALS; RATE; ADSORPTION; WATER; RAINFALL; APPLICATION; TRANSLOCATION

KHIB5 (5-chloro-n-isopropenylbenzimidazolone), applied preemergence to cotton fields at 5-10 kg/ha, effectively controlled annual weeds. Although KHIB5 remained active for 2-5 months, incorporation into soil or increasing the application rate strengthened its herbicidal activity. Increasing soil moisture levels retarded the inactivation of KHIB5 in the soil. KHIB5 tended to remain in the top layer of the soil (was strongly adsorbed) independently of its application rate and the amount of rainfall.

1083
Perspectives on Herbicide Behavior in Soil

Upchurch, R.P.; Monsanto Co., St. Louis, Mo

Pestic. Chem., Proc, Int. Congr. Pestic. Chem., 2nd(24WAAY), 6, 127-38; 1972

REVIEW; HERBICIDES; SOILS; RATE; APPLICATION

A review which discusses the behavior of herbicides in soil in relation to the environment, rates or methods of herbicide application, and the development of new herbicides.

1084
Herbicidal Action of Mon-0573 As Influenced by Light and Soil

Upchurch, R.P.; Baird, D.D.; Monsanto Co., St. Louis, Mo.

Proc. West. Soc. Weed Sci.(WSWPAF), 25, 41-4; 1972

PHOSPHONOMETHYL GLYCINE; HERBICIDES; GRASS; LIGHT; MCN 0468; SOILS

1085
Fate of the Fungicide 2,6-dichloro-4-nitroaniline in Soil

Van Alfen, N.K.; Kosuge, T.; Univ. California, Davis, CA

Phytopathology, 63(2), 209; 1973

FATE; 2,6-DICHLORO-4-NITROANILINE; DCNA; DICHLORAN; METABOLITES; 4-AMINO-3,5-DICHLOROACETAN ILIDE; 2,6-DICHLORO-P-PHENYLENEDIAMINE; FUNGICIDES; SOILS; METABOLISM; TRACER

Labeled DCNA (dichloran) was rapidly metabolized in nonsterile, flooded soil amended with glucose. $^{14}CO_2$ was not detected during the experiment. A large fraction (up to 65%) of the radioactivity could not be extracted using an acetone-water system. The major extractable metabolite was identified as 4-amino-3,5-dichloroacetanilide, and 2,6-dichloro-p-phenylene-diamine was also recovered. In sterile soil most of the radioactivity extracted after 9 days was intact DCNA.

1086
Physico-Chemical Study of the Adsorption of Organic Pesticides by Clay Minerals

Van Bladel, R.; Faculte des Sciences Agronomiques de Louvain, Belgium

Annales de Gembloux, 77(3), 183-194; 1971

SALT; SOILS; ADSCRPTION; ORGANIC PESTICIDES; CLAY; FENURON; MONTMORILLONITE; BENTONITE; PH

Some experimental results regarding the adsorption of fenuron by 2 types of clay minerals (montmorillonite and Wyoming-bentonite) are discussed with particular reference to the effect of pH, salt concentration and type of clay mineral. Adsorption increased with decreasing pH and with salt concentrations greater than 1.0 N NaCl. Adsorption was considerably higher on bentonite than on montmorillonite.

1087
An Evaluation of Kinetic and Equilibrium Eqautions for the Prediction of Pesticide Movement through Porous Media

Van Genuchten, M.T.; Davidson, J.M.; Wierenga, P.J.

Soil Sci. Soc. Am. Proc., 38(1), 29-35; 1974

ADSORPTION; DESORPTION; PESTICIDES; KINETICS; EQUILIBRIUM; MOVEMENT; POROUS MEDIA

1088
Effect of Several Herbicides on Bacterial Populations and Activity and the Persistence of These Herbicides in Soil

Van Schreven, D.A.; Lindenbergh, D.J.; Koridon, A.; Biol. Lab., Ijsselmeerpolders Dev. Auth., Kampen, Netherlands

Plant Soil (PLSOA2), 33(3), 513-532; 1970

PERSISTENCE; IOXYNIL; DALAPON; MECOPROP; DICHLORPROP; MCPA; PICLORAM; AMITROLE; HERBICIDES; SOILS; BACTERIA; AZOTOBACTER; NITRIFICATION; MICROORGANISMS

1089
Effect of Several Herbicides on Bacterial Populations and Activity and the Persistence of these Herbicides in Soil

Van Schreven, D.A.; Lindenbergh, D.J.; Koridon, A.; Biol. Lab., Kampen, Netherlands

Pl. Soil 33, 513-532; 1970

HERBICIDES; BACTERIAL POPULATIONS; PERSISTENCE; ICAM; NITRIFICATION RATE; DALAPON, DICHLOROPORP; IOXYNIL; MECOPROP, AMITROLE; PICLORAM; MCPA; MICROORGANISMS; SOILS

Samples of polder soil (illitic sandy loam) were incubated (at 29 degrees C and 65% water-holding capacity) with different herbicides applied at normal and 10- or 100-fold rates; the effects of herbicides on nitrification rate were studied in $(NH_4)_2SO_4$-treated samples. Azotobacter counts were decreased after 2-4 weeks by normal rates of dalapon, dichloroprop, ioxynil and mecoprop, and by all herbicides applied at the 100-fold rate; in several cases bacterial populations increased in treated soils for longer or shorter periods. Normal rates of herbicides slightly depressed nitrification in the first week; nitrification tended to be strongly inhibited for some time (especially by amitrole-T) at the 10-fold rate and all herbicides (except picloram), at the 100-fold rate, depressed nitrification for longer or shorter periods. Evolution of CO_2 in the first week was highly significantly depressed by herbicides, especially when applied at very high rates. After 9 months, traces of dalapon and mecoprop, 7.2% ioxynil, 29.8% dichlorprop, 39% MCPA + dichlorprop, and about 52% piocloram and amitrole -T persisted in active form.

1090

Bio Degradation of Piperonylic-Acid an Insecticide Synergist by a Soil Pseudomonad

Vasavada, P.C.; Forney, F.W.

Abstr. Annu. Meet Am. Soc Microbiol., 73, 31; 1973

DEGRADATION; INSECTICIDES; SOILS

1091

Residues of Heptachlor in Plants and Soil in Relation to the Method of its Use

Vasil'ev, V.P.; Kosmatyi, E.S.; Fudel, K.A.; Polonskaya, F.I.; Zatserkovskii, V.A.

Khim. Sel'sk. Khoz., 10(3), 32-34; 1972

HERBICIDES; SOILS; RESIDUES; HEPTACHLOR; PLANTS

1092

Interactions Between Pesticides and Soil Microorganisms

Venkataraman, G.S.; Rajyalakshmi, B.; Div. Microbiol., Indian Agric. Res. Inst., New Delhi, India

Indian J. Exp. Biol.(IJEBA6) 1971, 9(4) 521-2; 1971

PESTICIDES; SOILS; MICROORGANISM; DALAPON; AZOTOBACTER; DITHANE; BACTERIA; ACTINOMYCETE; FUNGI; 2,4-D; CERESAN M

While soil fungal population was not adversely affected by Dalapon Ceresan M, dithane, 2,4-D, and four other pesticides, the bacterial and actinomycetes populations were suppressed. Species of ASPERGILLUS, the dominant constituents of the fungal flora, were tolerant to most of the pesticides. Also, AZOTOBACTER CHROOCOCCUM exhibited considerable strain varition in its tolerance to different pesticides.

1093

Fate of the Herbicide Dichlobenil in Plants and Soil in Relation to its Biological Activity

Verloop, A.; Res. Lab., N. V. Philips-Duphar, Weesp, Netherlands

Residue Rev.(RREVAH, 43, 55-103; 1972

REVIEW; DICHLOBENIL; PLANTS; SOILS; HERBICIDES; AVAILABILITY; DEGRADATION; BIOLOGICAL ACTIVITY

1094

Recent Data on the Behaviour of Dichlobenil in Soil

Verloop, A.; Nimmo, W.B.; Forschungslaboratorium, Philips-Duphar, Weesp, Netherlands

Sonderheft Zeitschrift fur Pflanzenkrankheiten (PFLANZENPATHOLOGIE) und Pflanzerschutz, 6, 53-58; 1972

DECOMPOSITION; SORPTION; EVAPORATION; PENETRATION; DEGRADATION PRODUCTS; 2,6-DICHLOROBENZAMIDE; SOILS; DEGRADATION; HERBICIDES

Decomposition, sorption, evaporation loss, and penetration into soil of the herbicide and of its degradation product (2,6-dichlorobenzamide) are discussed.

1095

Herbicide Dichlobenil and its Decomposition Products in Soils and Water

Verloop, A.; Nolle, H.H.; Forschungslab., N. V. Philips-Duphar, Weesp, Netherlands

Schriftenr. Ver. Wasser-, Boden-, Lufthyg., Berlin-Dahlem(SVWLAE), 37, 85-9; 1972

DICHLOBENIL; SOILS; WATER; HERBICIDES; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS; RESIDUES; EVAPORATION; PLANTS; HYDROXYLATION; CONJUGATION; 2,6-DICHLOROBENZAMIDE; 2,6-DICHLOROBENZOIC ACID; DECARBOXYLATION; ADSORPTION;DEGRADATION; METABOLITES; FISH; MUCK

A large portion of applied dichlobenil is lost by evaporation. What is left in aquatic and terrestrial plants breaks down through hydroxylation and conjugation. Dichlobenil is hydrolyzed into 2,6-dichlorobenzamide and further converted into 2,6-dichlorobenzoic acid for further decarboxylation in the soil where the 2,6-dichlorobenzamide is taken up, hydroxylated, and conjugated by plants. The adsorption rate was reduced and the degradation rate increased in risistant aquatic plant species, compared to susceptible ones. Dichlobenil accumulated temporarily and then was rapidly eliminated in aqtatic plants. Elimination of both dichlobenil and its metabolites and little evidence of metabolite residues were observed in fish. Initial dichlobenil concentrations of 0.5-1.5 ppm in water fell to or below 0.05 ppm in 2-3 months. Dichlobenil was eliminated from benthic muck in six months. 2,6-dichlorobenzamide was not detected in fish.

1096

Modern Viewpoints in the Toxicological Evaluation of Pesticides

Verschuuren, H.G.

Nahrung, 16(2), 126-127; 1972

PLANTS; ANIMALS; SOILS; PESTICIDES

1097

Action of Simazine on the Antibiotic Activity of Microscopic Soil Fungi

Vlahov, S.; Damyanova, L.; Gousterov, G.; Kamenova, I.

Part of Szegi, J. (Ed.). Proceedings of the Symposium on Soil Microbiology, Vol. 2. Budapest, Hungary, June 16-20, 1970. Akademiai Kiado: Budapest, Hungary, 1972, (p. 365-368) 454 p.; 1972

SIMAZINE; ANTIBIOTIC; SOILS; FUNGI

1098
Residues of Dieldrin, Lindane, DDT, and Parathion in a Light Sandy Soil after Repeated Application Throughout a Period of 15 Years

Voerman, S.; Besemer, F.H.; Lab. Res. Insect., Pl. Prot., Wageningen, Netherlands

J. Agric. Fd Chem., 18, 717-719; 1970

PESTICIDES; CROPS; DDT; DIELDRIN; LINDANE; RESIDUES; SOILS; PERSISTENCE; PLANTS

The pesticides were sprayed on crops several times a year and applied as soil treatments once a year. DDT and dieldrin were more persistent than lindane but, below 20 cm, they appeared only as traces. Parathion disappeared about one-half year after the last application.

1099
Pesticide Residues in Nature

Voevodin, A.V.; USSR

Zashch. Rast. (Moscow)(ZRVBAS), 16(8), 24-5; 1971

REVIEW; PESTICIDES; RESIDUES; DDT; SOILS; WATER; DICHLOROPHENOXYACETATE; PLANTS; PHENOXYACETATE ACIDS; FOOD; 2,4-D

1100
Effect of a Soil Absorbing Complex on the Phytotoxicity of Herbicides

Voitekhova, V.A.; Nauchno-Issled. Inst. Udobr. Insektofungits., Moscow, USSR

Khim. Sel. Khoz.(KSKZAN), 9(5), 359-63; 1971

SOILS; HERBICIDES; ABSORPTION; PHYTOTOXICITY; ATRAZINE; SIMAZINE; CHERNOZEM; SAND; ATRAZINE; SIMAZINE; WATER; HUMUS

Experiments with varying mixtures of chernozem and sand showed that the amount of atrazine and simazine absorbed by the soil, and therefore the phytotoxicity of the herbicides, was dependent on the amount of organic material and water in the soil.

1101
Water Regime of Soil in Relation to the Use of Herbicides

Volodin, V.S.

Nauchn. Tr. Kursk. Gos. S-Kh. Optn. Stn., 4, 1969
Trans., 179-184

CORN; SIMAZINE; ATRAZINE; 2,4-D; HERBICIDES; WATER; SOILS

1102
Rate of Degradation of Phosphamidon and Residual Values

Voss, G.; Geissbuhler, H.

Residue Reviews, 37, 133-152; 1971

DEGRADATION; PHOSPHAMIDON; RESIDUES

1103
Some Current Problems in the Hygiene of Pesticides

Vrochinskii, K.K.

Gigiena I Sanit., 34(5), 110-111; 1969

RESIDUES; UREA; 2,4-D; S-TRIAZINE; HERBICIDES; SEVIN; FRUITS CROPS; DDT; ACCUMULATION; MIGRATION; FLORA; FAUNA; FOOD; HCH; PERSISTENCE; WATER; PESTICIDES

Topics such as the potential hazards of environmental contamination with residues of urea, 2,4-D derivative and s-triazine herbicides and sevin on fruit crops are discussed. DDT soil accumulation and migration and DDT accumulation in Ukranian flora and fauna received attention. A paper on the hygienic evaluation of food products in relation to DDT and HCH use and persistance in white Russia was presented. A report was given on hydraulic, geological and other factors in relation to surface water quality and the degree of pesticide pollution. Atmospheric carbophos contamination in agriculture in Uzbekistan was the subject of another report. The conference also discussed existing principles for setting up norms for pesticides in the environment on the basis of several pertinent papers. The conference adopted an expanded resolution determining the basic directions for research into the problem areas it was concerned with.

1104
Migratory Properties of Pesticides in a Model Water Ecosystems

Vrochinskii, K.K.

Ryb. Khoz. (MOSCOW)(RYKHAK), 11, 29-31; 1973

PESTICIDES; MIGRATION; AQUATIC ECOSYSTEMS; INSECTICIDES; WATER; HERBICIDES; FUNGICIDES; ACARBACIDE; FENURON; MELPREX; POLYCARBAZINE; MODEL; GAMMA-HEXACHLOROCYCLOHEXANE; RESERVOIRS

The migratory properties and stabilities of fenuron, melprex, polycarbazine, and 8 insecticides, including gamma-hexachlorocyloclohexane were studied in a model aquatic ecosystem. Objective criteria for determining the dangers of various pesticide uses in agriculture, such as for treatment of water reservoirs, were determined from the compiled data.

1105
Agricultural Pollution

Wadleigh, C.H.

Part of Poole, Daniel A. (President). Transactions of the 35th North American Wildlife and Natural Resources Conference. Man's Stake in a Good Environment. Wildlife Management Institute: Wire Building, Washington, DC; 1970

INSECTICIDES; PESTICIDES; FERTILIZERS; SOILS; EROSION; WATER; AGRICULTURE

1106
Kinetics of Losses of PCNB and DCNA in Three California Soils

Wag, C.H.; Broadbent, F.E.; Dep. Soils Plant Nutr., Univ. California, Davis, Calif.

Soil Sci. Soc. Amer., Proc.(SSSAA8), 36(5), 742-5; 1972

FUNGICIDES; SOILS; CHLORONITROBENZENE; CHLORONITROANILINE; PCNB; DCNA

The losses of PCNB and DCNA in 3 California soils were measured in the lba. Under controlled temperature and moisture content, both fungicides were lost according to 1st-order kinetics. Higher and soil organic matter was assocd. With slower PCNB loss, but enhanced DCNA loss. PCNB was lost mainly through volatilization, whereas DCNA was lost through microbial degradation and other processes.

1107
Action of Fungicides (Thiuram, Vapam) on the Degradation of Triazine Herbicides in Soil

Wagenbreth, D.; Kluge, E.; Inst. Forstwiss., Dtsch. Akad. Landwirtschaftswiss. Berlin, Eberswalde, Germany

Arch. Pflanzenschutz(AVPZAR), 7(6), 451-9; 1971

FUNGICIDES; HERBICIDES; DECOMPOSITION; SOILS; THIURAM; SIMAZINE; VAPAM; PROMETRYNE

The fungicides, thiuram and vapan, inhibited the breakdown of the triazine herbicides, Prometryne and simazine by inhibiting the herbicide-decomposing microorganisms such as RHIZOCTONIA SOLANI, in the soil. As a result of this inhibition, the triazin herbicides showed a prolonged time of action, and consequently the number of postemergence treatments with herbicides could be decreased.

1108
A Simple Biotest Method for Estimating the Leaching of Herbicides in Soil Columns and Means of Mathematical-Statistical Evaluation

Wagenbreth, D.; Trommer, R.

Nachrbl. Dt. Pfl-Schutzdienst, Berl. 2, 24-31; 1971

BIOTEST METHOD; LEACHING; HERBICIDES; SOIL COLUMNS; STATISTICAL EVALUATION

1109
Possible Importance of Transfer Factors in the Bacterial Degradation of Herbicides in Natural Ecosystems

Waid, J.S.; Dep. Bot., Univ. Canterbury, Christchurch, New Zealand

Residue Rev.(RREVAH), 44, 65-71; 1972

REVIEW; BACTERIA; HERBICIDES; SOILS; GENETICS; TRANSFER; DEGRADATION; MECHANISM; DECOMPOSITION; MICROFLORA; MODIFICATION; MICROORGANISMS; EPISOMAL TRANSFER

The genetic mechanism by which microorganisms are modified so that they can decompose herbicides that ordinarily resist decomposition is discussed. The episomal transfer of genetic information may preserve the ability of natural microflora to degrade resistant molecules. (25 references)

1110
Vertical Distribution of Herbicides in Soil and Their Availability to Plants. Treatment of Different Proportions of the Total Root Systems

Walker, A.; National Veg. Res. Stn., Wellesbourne/Warwick. England

Weed Res. (WEREAT), 13(4), 416-21

HERBICIDES; UPTAKE; PLANTS; ROOTS; WHEAT; ATRAZINE; LINURON; CARBON 14; SEEDLINGS; SOILS; DISTRIBUTION

The uptake of 14C-labeled atrazine and linuron by wheat TRITICUM AESTIVUM seedlings was proportional to the fraction of the total root system exposed to herbicide-treated soil. This factor would offset the effect of the redness in herbicide concentration in soil, following incorporation of kg/ha to 3,6, or 9 cm depths.

1111
Effects of Quintozene on the Persistence and Phyto Toxicity of Chlorpropham and Sulfallate in Soil

Walker, A.

Hort. Res., 10(1), 45-49; 1970

CABBAGE; HERBICIDES; FUNGICIDES; SYNERGISM; GROWTH INHIBITION; DISEASE CONTROL; CHLORPROPHAM; SULFALLATE; SOILS; QUINTOZENE; PERSISTENCE; PHYTOTOXICITY; HALF-LIFE

In pot experiments, the disappearance of chlorpropham incubated at 1.6 ppm in soil at 23 degrees c with and without 96 ppm of quintozene was determined by bioassay. Quintozene increased the half-life of chlorpropham from 11.5 to 18.5 days. In a similar experiment, the half-life of sulfallate was increased only slightly. Quintozene was slightly toxic to cabbage seedlings, and this effect was additive with the growth inhibition caused by chlorpropham. Sulfallate and a proprietary mixture of sulfallate plus chlorpropham also produced additive effects with quintozene.

1112
Availability of Linuron to Plants in Different Soils

Walker, A.; National Vegetable Research Station, Wellesbourne/Warwick, England

Pestic. Sci. (PSSCBG), 4(5), 665-75; 1973

LINURON; AVAILABILITY; WHEAT; HERBICIDES; ADSORPTION; DESORPTION; PLANTS; SOILS; UPTAKE; REDISTRIBUTION

Total uptake of linuron by wheat seedlings in nutrient solutions was close to that expected from the product of the amounts of water transpired by the plants and the concentrations of herbicide in solution. Uptake from 19 different soils was less than the amount supplied by mass-flow when the concentrations of linuron in the soil solution were estimated from slurry adsorption measurements. Using a pressure-membrane technique, it was shown that the acutal soil solution concentrations of linuron were less than those estimated, and following rewetting of pressure-membrane samples, the rate of redistribution of linuron between the adsorbed and solution phases was low. The results suggest that under the conditions of the uptake experiments, the systems were not in equilibirum, and show that the rates of adsorption and desorption of linuron may be important in determining its availability to plants.

1113
Influence of Soil Factors on Availability of Atrazine and Linuron to Plants

Walker, A.; National Vegetable Research Station, Wellesbourne, United Kingdom

Proceedings, 11th British Weed Control Conference 2, 800-805; 1972

PLANTS; AVAILABILITY; ADSORPTION; ATRAZINE; LINURON; SOILS; UPTAKE; HERBICIDES; WHEAT

The adsorption of C14-labelled atrazine and linuron in various soils was studied in laboratory incubation experiments and the uptake of the herbicides from soil by wheat seedlings was studied in pot experiments. Atrazine was less strongly adsorbed than linuron. Plant herbicide concentrations were directly proportional to the rates applied to the soil.

1114
Availability of Atrazine to Plants in Different Soils

Walker, A.; Natl. Veg. Res. Stn., Wellesbourne/Warwick, England

Pestic. Sci. (PSSCBG) 3(2), 139-148; 1972

ADSORPTION; TRANSPIRATION; ATRAZINE; PLANTS; UPTAKE; SOILS; HERBICIDES; NUTRIENTS

1115
Vertical Distribution of Herbicides in Soil and Their Availability to Plants. Shoot compared with Root Uptake

Walker, A.; Natl. Veg. Res. Stn., Wellesbourne/Warwick, England

Weed Res. (WEREAT), 13(4), 407-15

HERBICIDES; SOILS; PLANTS; SHOOT; ROOTS; UPTAKE; ATRAZINE; TURNIPS; LETTUCE; RYEGRASS; SEEDLINGS; VERTICAL DISTRIBUTION; INURON; AZIPROTRYNE; SIMAZINE; LENACIL; PRONAMIDE; CHLOROPROPHAM; CARBON 14; SHOOT-ZONE; ROOT-ZONE; TRACER

Experiments were carried out by separating root and shoot exposure of turnip (BRASSICA RAPA), lettuce (LACTUCA SATIVA) or ryegrass (LOLIUM PERENAE) seedlings to herbicides, in order to simulate conditions originating from the unequal vertical distribution of herbicides in soil. Atrazine, inuron, aziprotryne and to a lesser degree simazine and lenacil applied to shoots, were toxic at concentrations which were lower than those resulting from normal field applications. Root exposure to all 5 herbicides caused seedlings deaths at concentrations lower than those required for shoot-zone toxicity. Pronamide and chlorpropham were tested against ryegrass only, and were toxic only when localized in the shoot zone. Root exposure suppressed root growth, but the shoots grew normally if the soil was kept moist. At emergence, the atrazine-14C uptake was higher in the shoot-zone as compared to the root-zone, but whereas the shoot-zone uptake remains stationery, the root-zone uptake increased with time.

1116
Persistence of Pronamide in Soil

Walker, A.; National Vegetable Research Station, Wellesbourne, Warwick, England

Pestic. Sci., 1, 237-239; 1970

SOILS; SOIL MOISUTRE; HALF-LIFE; PERSISTENCE; PRONAMIDE; LEACHING; DECOMPOSITION

Under field conditions, there was little loss of herbicidal activity after spring application of pronamide when the soil temperature remained below about 13 degrees C, but under normal summer conditions the half-life was only 2-4 weeks. The rate of loss was decreased when the surface soil became very dry. After autumn application, activity did not change during the winter and little leaching from the top 5 cm had occurred by the following spring. In the laboratory, decomposition of pronamide followed first-order kinetics. Half-lives at 10% soil moisture were 29 days at 23 degrees C, 63 days at 15 degrees and 140 days at 8 degrees. At 23 degrees, the half-life was extended to 52 days when the soil-moisture content was decreased by 50%.

1117
New Criteria for Development of Herbicides

Walker, E.A.

Proc. Northeast Weed Contr. Conf., 24, 429-431; 1970

PLANTS; ANIMALS; RESIDUES; DEGRADATION; HERBICIDES; CRITERIA

1118

The Effects of Horticultural Practices on Man and His Environment

Walker, K.C.

Hortscience, 5(4), 239-242; 1970

PESTICIDES; PLANTS; NUTRIENTS; SALINITY; WATER; SMOKE; SOILS; EROSION; HORTICULTURE

1119

Use of Granular Pesticides from the Point of View of Residues

Walker, P.T.; Trop. Pestic. Res. Unit, Overseas Dev. Adm., Porton Down/Salisbury, England

Residue Rev.(RREVAH), 40, 65-131; 1971

REVIEW; GRANULAR APPLICATION; PESTICIDES; RESIDUES; BIRDS; SOILS; CROPS; BEES; INSECTS; WATER; FOOD CHAINS; HUMANS

A review of granularlar pesticide residues, with discussions on granule distribution, use in water, use in soil, use on crops, residues in bees, birds, and food chains, and toxic hazards to human beings, with 400 references.

1120

Degradation of Malathion by Indigenous Soil Microorganisms

Walker, W.W.; Mississippi State Univ., State College, Miss.

Univ. Microfilms, Ann Arbor, Mich., Order No. 72-25,991, Diss. Abstr. Int. B., 1972, 33(4), 1347; 1972

MALATHION; DEGRADATION; SOILS; MICROORGANISMS; IN VITRO; THIN LAYER CHROMATOGRAPHY; ENZYME INHIBITION

Degradation of malathion by five soil bacteria was demonstrated. One of these, an ARTHROBACTER species, readily degraded malathion in vitro to malathion halfester, malathion dicarboxylic acid, potassium dimethyl phosphorodithioate, potassium dimethyl pohsphorothioate, and an unidentified metabolite. O-demethyl malathion, potassium salt, was produced by a nonbiological mechanism. Metabolites were tentatively identified by thin-layer chromatography and confirmed by infrared spectroscopy. Acetylcholinesterase inhibtion was determined manometrically for each metabolite. Malathion half-ester had one-third the enzyme toxicity of malathion while other metabolites showed essentially no enzyme inhibition. Conversion of malathion to malathion half-ester may represent complete malathion degradation, but not complete insecticide detoxication. Upon its return to the environment, thenvironment, the bacterium's ability to degrade malathion was severely impeded. The loss of activity was attributed either to the bacterium's inability to reestablish itself in the soil after prolonged culturing or to adsorption of the bacterial cells by the soil solids, rendering the cells unavailable for insecticide metabolism.

1121

Malathion Degradation by an ARTHROBACTER Species

Walker, W.W.; Stojanovic, B.J.

J. Environ. Quality, 3(1), 4-10; 1974

ORGANOPHOSPHORUS INSECTICIDES; MICROORGANISMS; DISSIPATION; SOILS; BIOMETABOLITES; DEGRADATION; MALATHION HALF-ESTER; MALATHION DICARBOXYLIC ACID; POTASSIUM DIMETHYL PHOSPHOROTHIOATE; POTASSIUM DIMETHYL PHOSPHORODITHIOATE; O-DESMETHYL MALATHION; POTASSIUM SALT; INSECTICIDES

The dissipation of malathion from agricultural soils has been shown to involve both chemical and biological mechanisms, with biodegradation being of substantial magnitude. This investigation was conducted to (1) isolate from soil by enrichment techniques a bacterium or several bacteria capable of readily metabolizing malathion, and (2) isolate and identify the malathion metabolites resulting from this microbial degradation. Of 18 soil bacteria examined, 5 were capable of utilizing the malathion molecule with degradation of added insecticide ranging from 47 to 95%. The most efficient malathion utilizer, an ARTHROBACTER species, degraded malathion to malathion half-ester, malathion dicarboxylic acid, potassium dimethyl phosphorothioate, potassium dimethyl phosphorodithioate, and one other unidentified metabolite. O-desmethylmalathion, potassium salt, was also produced, but the mechanism involved was nonbiological in nature. Malathion dissipation was monitored by electron-capture gas-liquid chromatography, and metabolites were identified by thin-layer chromatography and infrared spectroscopy.

1122

Microbial Vs. Chemical Degradation of Malathion in Soil

Walker, W.W.; Stojanovic, B.J.

J. Environ. Qual., 2(2), 229-232; 1973

ORGANOPHOSPHATES; INSECTICIDES; PH; HYDROLYSIS; DEGRADATION; MALATHION; SOILS

1123

Interaction of Three Iowa Soils with the Organophosphorus Insecticide Phorate and its Metabolites, and the Effect of These Compounds on Southern Corn Rootworm Larvae

Waller, J.B.; Iowa State Univ., Ames, Iowa

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-9457, Diss. Abstr. Int. B., 83(10), 4848; 1972

SOILS; PHORATE; CORN; ROOTWORM; ORGANOPHOSPHORUS INSECTICIDES

1124
Phorate Loss from Iowa Soils as Affected by Time, Temperature, and Soil Sterilization

Waller, J.B.; Dahm, P.A.

Proc. North Central Branch Entomol. Soc. Am., 28, 171; 1973

INSECTICIDES; PHORATE; SOILS; TEMPERATURE; PERSISTENCE; SOIL STERILIZATION

1125
Decomposition of Phenyl Amides by Soil Micoorganisms

Wallnoefer, P.

Mitt Biol. Bundesanst Land- Forstwirtsch Berl-Dahlem, 146, 169; 1972

SOILS; DECOMPOSITION; HERBICIDES; FUNGICIDES; PHENYLAMIDES; MICROORGANISMS

1126
The Behavior of Pesticides as Environmental Chemicals in Nature, as Exemplified by Some Phenylamides

Wallnoefer, P.; Bayerische Landesanstalt fuer Bodenkultur und Pflanzenbau, Munich, Germany

Gesunde Pflanz., 24(11), 180-183; 1972

ACYLANILIDES; ANILINE; PHENYLAMIDES; DECOMPOSITION; MONALIDE; PROPHAM; MICROORGANISMS; DEGRADATION; METABOLISM; HERBICIDES; FUNGICIDES; MODEL EXPERIMENTS; CARBOXIN; CHLOROBENZOIC ACID ANILIDE; TOLYLIC ACID ANILIDE; PYRANIC ACID ANILIDE; OXIDATION; HYDROXYLATION

The mechanism of the microbial metabolism and soil degradation of some herbicides and fungicides was studied in model experiments using N-phenylcarbamic acid esters, N-methoxyphenylureas, and acylanilides. Metabolism of carboxin, chlorobenzoic acid anilide, tolylic acid anilide, and pyranic acid anilide by MUCORACEAE and RHIZOPUS species was observed. Various MUCORACEAE and RHIZOPUS species were able to oxidize these compounds at the acyl and aniline radicals. The side chains of the acid radicals are preferentially hydroxylated, while sulfur in carboxin is oxidized to sulfoxide and sulfone. The anilides of 2-methylbenzoic acid and 2-chlorobenzoic acid are hydroxylated on the aniline moieties. The extent of such metabolic processes under aerobic conditions ranged from 10% to 90%. Acylanilides, and possibly also N-phenylcarbamic acid esters, were attacked by BACILLUS SPHAERICUS at the amide bonds. However, B. SPHAERICUS is unable to further metabolize the anilines resulting from the metabolism of the phenylamides. Anilines can be further decomposed by other microorganisms of the soil, e.g., by oxidative dimerization to carbon dioxide and ammonia. The free acids from the decomposition of phenylamides such as monalide and propham are easily inactivated by soil microorganisms, while B. SPHAERICUS is unable to degrade the acids formed from acylanilides. (18 references)

1127
Persistence and Movement of C-6989 in Soils and Plants

Walter, J.P.; Eastin, E.F.; Merkle, M.G.; Texas A & M university College Station, Texas

Abstract, Part of Proceedings Twenty-Second Annual Meeting of Southern Weed Science Society, 1968 (p. 121); 1969

FLUORODIFEN; LOAM; LEACHING; PERSISTENCE; MOVEMENT; SOILS; C-6989; PLANTS

After application of fluorodifen (C-6989) at 3-4.5 lb/acre, chromatographic analysis showed that less than 10% remained after 5 months in a clay and less than 50% after 3 months in a sandy loam. There was little tendency to leaching.

1128
Effect of Soil Treatments on Losses of Two Chloronitrobenzene Fungicides

Wang, C.H.; Broadbent, F.E.; Dep. Soils Plant Nutr., Univ. California, Davis, Ca

J. Environ. Qual.(JEVQAA), 2(4), 511-15; 1973

CHLORONITROBENZENE; CHLORONITROANILINE; SOILS; FUNGICIDES; OXYGEN; HUMUS; PERSISTENCE; PCNB; DCNA; WATER; OXYGEN; ANAEROBIC; DERIVATIVES; PENTACHLOROTHIANISOLE; PENTACHLOROTHIANILINE; RATE; MOISTURE; TEMPERATURE; CALCIUM NITRATE

The persistence of PCNB and DCNA (2,6-dichloro-4-nitroaniline) in soils can be decreased by organic amendments and excess water. As shown in the laboratory, these fungicides were rapidly lost from soils made anaerobic by flooding or oxygen exclusion. Losses were mainly due to microbial degradation pentachloroaniline and possibly pentachlorothioanisole were found to be degradation products of PCNB. Organic amendments increased the rate of fungicide loss in flooded conditions, but not at field moisture capacity. Degradation in flooded soils was retarded by free oxygen or calcium nitrate. Rates of loss varied directly with temperature from 15 to 35 degrees.

1129

Adsorption of Parathion in a Multi-Component Solution

Wang, W.C.; Lee, G.F.; Spyridakis, D.; Illinois State Water Survey, Peoria, Il

Water Res., 6(10), 1219-1228; 1972

CLAY; LAKES; SEDIMENTS; METHYLENE BLUE; PHENOL; ADSORPTION; PARATHION; RHODAMINE B

Adsorption of parathion on different clay minerals in aqueous suspension was enhanced by rhodamine b, but not methylene blue. The amount of parathion adsorbed increased with increasing rhodamine b:clay ratio regardless of particle size, and a 6-fold increase in parathion adsorption was noted at 2.4 mg rhodamine b/g of clay (0.3-1 micrometers). Phenol had a slight inhibitory effect on adsorption. In both cases, equilibrium was reached within 1 hour. In contrast, lake sediments from which the organic matter was partially removed had increased parathion adsorption capacity. From 14 to 21% of the adsorbed parathion could be removed with distilled water, indicating a weak parathion-clay association.

1130

DDT Moratorium in Arizona. Agricultural Residues After 2 Years

Ware, G.W.; Estesen, B.J.; Cahill, W.P.; Dep. Entomol., Univ. Arizona, Tucson, Ariz.

Pestic. Monit. J.(PEMJAA), 5(3), 276-80; 1971

DDT; ORGANOCHLORINES; INSECTICIDES; ALFALFA; FAT; RESIDUES

The 1969 and 1970 moratorium on agricultural use of DDT in Arizona was very effective. Residues on green alfalfa declined to a plateau of 0.05 ppm. Residues in beef fat dropped in 1970 to one-half the level found in 1969. Soil residues changed only negligibly, suggesting a half-life greater than 10-12 years. The residues were primarily DDE, indicating that any future porblems during the DDT moratorium will be attributable to this "universal contaminant" rather than to the parent DDT.

1131

Decomposition of Pesticides by Soil Microrganisms. Special Emphasis on the Flooded Soil Condition

Watanabe, I.; Fac. Agr., Iwate Univ., Iwate, Japan

Jarq (Jap. Agr. Res. Quart.)(JARJA9) 1973, 7(1), 15-18; 1973

HYDROLYSIS; REVIEW; PESTICIDES; MICROORGANISM; SOILS; HERBICIDES; INSECTICIDES; PERSISTENCE; DEGRADATION; PCP; FLOODING; PROPANIL; DIPHENYL; ORGANOCHLORINE; BHC; DDT; TDE; METHOXYCHLOR; HEPTACHLOR; ORGANOPHOSPHATES

The persistence of pesticides in flooded and upland soil is reviewed. Degradation of PCP was primarily achieved by bacteria and occurred at a more rapid rate in flooded soil. Soil flooding accelerated the rate of degradation of propanil and decreased the rate of degradation of swep. Diphenyl ethers and most of the organochlorine insecticides tested (BHC, DDT, TDE, methoxychlor, and heptachlor) disappeared more rapidly under flooded conditions. Several of the organophosphates are hydrolzyed to products which cannot be further degraded in flooded soil. In some cases primary metabolic routes differ depending on the condition of the soil.

1132

Isolation of Pentachlorophenol Decomposing Bacteria from Soil

Watanabe, I.; Fac. Agric., Iwate Univ., Ueda, Japan

Soil Sci. Plant Nutr. (Tokyo)(Sspnaw) 1973, 19(2), 109-16; 1973

PENTACHLOROPHENOL; METABOLISM; SOILS; BACTERIA; HERBICIDES

1133

Residual Activity of Paraquat in Soils. 2. Adsorption and Desorption

Watkin, E.M.; Sagar, G.R.; Sch. Plant Biol., Univ. Coll. North Wales, Bangor, Wales

Weed Res.(WEREAT), 11(4), 247-56; 1971

PARAQUAT; RESIDUES; SOILS; HERBICIDES; GRAMOXONE; LOAM; SAND; GRAVEL; PEAT; SPHAGNUM MASS; RYEGRASS

Paraquat, Gramoxone, or paraquat dichloride, was sprayed on gravel-sand, loam, compost, acid peat, and sphagnum moss soils and the residual phytotoxicity was determined by inhibition of LOLIUM PERENNE (ENGLISH RYEGRASS) germination. Low doses of paraquat (0.05 and 0.38 kg/ha, respectively) inhibited germination on sphagnum and peat soils, but higher doses (0.75 and 1.5 kg/ha, respectively) were necessary on compost and loam soils. Phytotoxicity-dose relations were essentially linear on gravel-sand. On all soils residual activity increased rapidly with dose once the minimum phytotoxic dose was reached. At 1.68 kg/ha compost soil, reducing the volume applied from 562 to 112 L./ha resulted in increased phytotoxicity. The persistence of a phytotoxic compost soil surface after disturbed HwO irrigation was evidence that paraquat persists in the adsorbed and not the desorbed phase. The reduction of residual activity on the treated surfaces after irrigation with an untreated-soil leachate suggested that some chemical fraction of the soil medium caused elution of residues from the soil. Cation exchange may be involved.

1134

Adsorption of the Herbicide 2, 4-D on Goethite

Watson, J.R.; Posner, A.M.; Quirk, J.P.

J. Soil Sci., 24(4), 503-511; 1973

SPH; IONIC STRENGTH; CARBOXYL GROUP; ANION; HYDROPHOBIC; AROMATIC COMPOUNDS; ADSORPTION; HERBICIDES; 2,4-D; GEOTHITE

1135
Interaction of Organic Pesticides with Particulate Matter in Aquatic and Soil Systems

Weber, J.B.; Crop Sci. Dep., North Carolina State Univs., Raleigh, NC

Part of Faust, S.D. (Chairman) Fate of Organic Pesticides in the Aquatic Environment, Symp. Div. of Pesticide Chemistry, 161st Meeting, American Chemical Society, Los Angeles, California, March 29-31, 1971, Advances in Chemistry Series III. American Chemical Society, Washington, D.C. (p. 55-120); 1972

MINERALS; ORGANIC MATTER; CHARCOAL; IONIZABILITY; MOLECULAR SIZE; FUNCTIONAL GROUPS; SOLUBILITY; VAPOR PRESSURE; ION EXCHANGE; DIPOLE INTERACTIONS; REVIEW; PESTICIDES; ADSORPTION; SOILS; ABSORPTION; CLAY

1136
Adsorption of s-Triazines by Montmorillonite as a Function of pH and Molecular Structure

Weber, J.B.; N. Carolina State University, Raleigh, NC

Proc. Soil Sci. Soc. Am. 34, 401-404; 1970

MELAMINE DERIVATIVES; ADSORPTION; MONTMORILLONITE; HERBICIDES; AMETRYNE; ATRAZINE; PROMETONE; MELAMINE; FUNGICIDES; PH; MOLECULAR STRUCTURE

Adsorption by Na montmorillonite of 11 structurally related herbicides (ametryne, atrazine, prometone, etc.), and of mealmine and melamine derivatives (fungicides) at different pH levels (pH 1, 2, 3, 6.5) and concentrations was investigated. The amounts adsorbed depended on the pH of the system and on the molecular structure of the compound (such as, dialkylamono greater than monoalkylamino groups), maximum adsorption occurring near the PKA of each compound and with higher basicity of the s-triazines used.

1137
Mechanisms of Adsorption of S-Triazines by Clay Colloids and Factors Affecting Plant Availability

Weber, J.B.; N. Carolina State Univ., Raleigh, NC

Residue Rev. 32, 93-130; 1970

HYDROGEN BONDING; REVIEW; PLANTS; HERBICIDES; ADSORPTION; PH; CATION EXCHANGE; CLAY; AVAILABILITY

The herbicides are readily adsorbed by various clay minerals. Adsorption is dependent on pH, having a maximum in the vicinity of the ionization constents of the respective compounds. Adsorption from a neutral solution was attributed to H-bonding and other non-ionic forces. At pH levels where the compounds were in the cationic form the process was attributed to cation exchange and complexing with H-ions on the clay surfaces. Other factors influencing adsorption are reviewed. (106 references)

1138
Activity and Movement of 13 Soil-Applied Herbicides as Influenced by Soil Reaction

Weber, J.B.; Best, J.A.; Crop Sci. Dep., North Carolina State Univ., Raleigh, N. C.

Proc., S. Weed Sci. Soc. (SWSPBE), 25, 403-13; 1972

HERBICIDES; SOILS; ACIDITY; MOBILITY; PERSISTENCE; WEEDS; GRASS; DICAMBA; NC 4780; BROMACIL; PYRICLOR; FENURON; DICHLOBENIL; FLUOMETURON; PROMETRYNE; CHLORAMBEN; PROPACHLOR; CDAA; CHLORPROPHAM; PARAQUAT

Broadleaf weeds were more prevalent in neutral soil (pH 7), than they were on acid soil (pH 5). The inverse was true for grass. The activities of 13 herbicides against broafleaf weeds on neutral soil were in the decreasing order: dicamba, bromacil, pyriclor, NC 4780, fenuron, dichlobenil, fluometuron, prometryne, chloramben, propachlor, CDAA, chlorpropham, and paraquat. For grass, the activity was in the decreasing order: bromacil, pyriclor, NC 4780, dicamba, chloramben, fenuron, propachlor, fluometuron, CDAA, prometryne, chlorpropham, dichlobenil, and paraquat. Only prometryne and paraquat were soil ph-dependent, both compounds being more active on neutral soil than on acid one. The relative mobilities of the herbicides were measured by their movements over the soil surface into adjacent control areas. Bromacil, pyriclor and NC 4780 were very mobile; fenuron, dichlobenil, propachlor, dicamba, chloramben, and fluometuron were of intermediate mobility; and chlorpropham, prometryne, cdaa and paraquat were immobile. The most persistent herbicides were bromacil, pyriclor, and NC 4780.

1139
The Influence of Temperature and Time on the Adsorption of Paraquat, Diquat, 2,4-D, and Prometone by Clays, Charcoal, and Anion Exchange Resin

Weber, J.B.; Perry, W.; Upchurch, R.P.

Soil Sci. Soc. Amer. Proc., 29, 678; 1965

ADSORPTION; PARAQUAT; DIQUAT; 2,4-D; PROMETONE; CLAY; CHARCOAL; ANION EXCHANGE RESIN

1140
Adsorption and Desorption of Diquat, Paraquat, and Prometone by Montmorillonitic and Kaolinitic Clay Minerals

Weber, J.B.; Weed, S.B.

Soil Sci. Soc. Amer. Proc., 32, 485; 1968

ADSORPTION; DESORPTION; DIQUAT; PARAQUAT; PROMETONE; MONTMORILLONITE; KAOLINITIC; CLAY

1141
Weber, J.B.; Weed, S.B.; Sheets, T.J.; North Carolina State Univ., Raleigh, NC

Crops Soils Mag., 25/1, (14-17); 1972

VOLATILITY; CATIONIC COMPOUNDS; ACIDIC COMPOUNDS; SOILS; MOVEMENT; REACTIONS; IONIC COMPOUNDS; REVIEW; PESTICIDES

In order to aid the farmer in controlling pests without harming the environment, this discussion explains how the three basic groups of pesticides move and react chemically in the soil. The basic groups are: non ionic volatile, nonionic nonvolatile, and ionic. The ionic group is further divided into three subsections: cationic compounds, basic compounds, and acidic compounds.

1142
Environmental Contamination by Persistent Pesticides

Wedemeyer, C.; West. Fish. Dis. Lab., Bur. Sport Fish. Wildlife Sand Point Naval Support Acitivity, Seattle, WA

Univ. of Washington Publ. Fish. New Ser., 5, 69-75; 1972

PERSISTENCE; ORGANOPHOSPHATES; ANIMALS; SOILS; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS; METABOLITES; PESTICIDES; REVIEW; DISTRIBUTION; BIODEGRADATION; CARBAMATES; DEGRADATION; FISH; RUNOFF; ANAEROBIC; DDE; DDA; DDT; NATURAL WATERS; CHLORINATED HYDROCARBONS; WILDLIFE; ORGANOCHLORINES

A selective review of literature concerning the occurrence, distribution, and effects of persistent pesticides in the environment indicates that the organochlorines are the least susceptible to biodegradation. The organophosphates and carbamates are more subject to degradation and are rarely stored in animal tissues. Significant levels of organochlorine pesticides are observed in higher trophic levels after application to an ecosystem. Since fish monitored close to the mouth of a major river contained higher residues than those obtained further away in the ocean, agricultural runoff must be a major source of pesticide contamination of natural waters. The long persistence of DDT in the soil may be in part due to the fact that anaerobic conditions are required for the conversion of DDT to DDE, the first step in the degradation to DDA. DDT and other chlorinated hydrocarbons have been implicated in loss of wildlife through eggshell thinning. Their use, although essential in some areas of public health and agriculture, should be regulated to minimize unknown, long-term effects in man. (31 references)

1143
Screening Microorganisms from 2 Soils for Utilization of the Systemic Fungicide Benlate

Weeks, R.E.; Hedrick, H.G.

Bacteriol. Proc., 71, 14; 1971

MICROORGANISMS; SOILS; FUNGICIDES; BENLATE

1144
Degradation of Carboxin (Vitavax) in Water and Soil

Wei-Tsung; Chin Stone, G.M.; Smith, A.E.; Uniroyal Chem., Naugatuck, Conn.

J. Agric. Fd. Chem. 18, 731-732; 1970

SOILS; DEGRADATION; CARBOXIN; VITAVAX; WATER; OXIDATION; SULPHOXIDE; SULPHONE

The oxidation of carboxin in soil to its sulphoxide was complete two weeks after application under glasshouse conditions, but no sulphone was detected.

1145
Adsorption von Chlorierten Kohlenwasserstoffen an Organischen Wassertruebstoffen und an Boeden. (Adsorption of Chlorinated Hydrocarbons on Organic Turbid Matter in Water and on Soils)

Weil, L.; Dure, G.; Quentin, K.E.; Inst. fuer Wasserchemie und Chem. Balneologie, Tech. Univ. Muenchen, Munich, Germany

Z. Wasser-Abwasserforsch, 6(4), 107-112; 1973

ADSORPTION; ORGANIC TURBID MATTER; LINDANE; HEPTACHLOR EPOXIDE; DIELDRIN; DDT; METHOXYCHLOR; SODIUM HUMATE; WATER; CLAY; 3,4,3(PRIME)-TRICHLOROBIPHENYL; 3,4,3,(PRIME),4(PRIME)-TETRACHLOROBIPHENYL; CLOPHEN A 60; EQUILIBRIUM MODEL; SOILS; SUSPENDED PARTICLES; HUMIC ACID; CHLORINATED HYDROCARBONS

The adsorption of lindane, heptachlor epoxide, dieldrin, DDT, methoxychlor, and Clophen A 60 (PVB) on sodium humate in tap water and on clay mineral soil particles was studied. The adsorption rates and adsorption capacities of both adsorbents increased in the sequence lindane, heptachlor epoxide, dieldrin, methoxychlor, DDT, 3,4,3(prime)-trichlorobiphenyl, 3,4,3(prime),4(prime)-tetrachlorobiphenyl and Clophen A 60. This sequence was independent of the type of the adsorbent. The ratio of the equilibrium constants determined for soil and sodium humate in water was 1:10. The rate of adsorption for DDT was about 1,000 times higher than that for lindane. While the equilibrium concentration in suspended sodium humate was reached in one hour, it needed about two weeks in soil. The adsorption heat for the DDT/humic acid system was about 2.5 kcal/mod. A model is given for the prediction of the adsorption capacity of different soils and suspended particles in surface waters.

1146
Analysis of Pesticides in Water. 7. Adsorption of Pesticides by Suspended Matter

Weil, L.; Quentin, K.E.; Jarrar, S.

Schriftenr. Ver. Wasser, Boden, Lufthyg., Berlin-Dahlem, No. 37, 77-84; 1972

ADSORPTION; ANALYSIS; CHLORINATED HYDROCARBONS; PESTICIDES; SOILS; SUSPENDED SOLIDS; WATER; LINDANE; HEPTACHLOR EPOXIDE; DIELDRIN; DDT; KAOLINITE; MONTMORILLONITE; UPTAKE

The uptake of lindane, heptachlor epoxide, dieldrin, and DDT on kaolinite and montmorillonite is studied in relation to total quantity and rate adsorption.

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB80-113111

Movement of Hazardous Substances in Soil A Bibliography. Volume 2. Pesticides

Oak Ridge National Lab, TN

Prepared for

Municipal Environmental Research Lab, Cincinnati, OH

Aug 79

United States
Environmental Protection
Agency

Municipal Environmental Research
Laboratory
Cincinnati OH 45268

EPA-600/9-79-024b
August 1979

Research and Development

PB80-113111

Movement of Hazardous Substances in Soil: A Bibliography

Volume 2
Pesticides

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1. REPORT NO. EPA-600/9-79-024b	2.	3. RECIPIENT'S ACCESSION NO. PB80-113111
4. TITLE AND SUBTITLE MOVEMENT OF HAZARDOUS SUBSTANCES IN SOIL: A BIBLIOGRAPHY Volume 2. Pesticides		5. REPORT DATE August 1979 (Issuing Date)
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Emily D. Copenhaver and Benita K. Wilkinson		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Toxic Materials Information Center Oak Ridge National Laboratory Oak Ridge, Tennessee 37830		10. PROGRAM ELEMENT NO. (FY79-1DC818) ROAP 21BFO, Task 002 1DD064
		11. CONTRACT/GRANT NO. Interagency Agreement EPA-IAG-D4-F476
12. SPONSORING AGENCY NAME AND ADDRESS Municipal Environmental Research Laboratory Office of Research and Development U.S. Environmental Protection Agency Cincinnati, Ohio 45268		13. TYPE OF REPORT AND PERIOD COVERED Final
		14. SPONSORING AGENCY CODE EPA/600/14

15. SUPPLEMENTARY NOTES
See also Volume 1. Selected Metals
Project Officer: Mike H. Roulier

16. ABSTRACT

This bibliography is intended for use by personnel concerned, either via research or management, with the disposal of hazardous wastes, other than sewage sludge, on land. It is the result of a search of recent literature (1970 through 1974) and includes information on the transport, transformation, and soil retention of arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, selenium, zinc, halogenated hydrocarbons, pesticides, and other hazardous substances. About half of the 2000 entries include an abstract. In order to limit the size of the resulting publication, the literature search focused on processes directly related to transport (adsorption, ion exchange, etc.) and documentation of the occurrence and extent of transport while specifically excluding topics such as uptake and translocation by plants, modeling, and effects on microorganisms and processes mediated by microorganisms. The bibliography has been divided into two volumes to facilitate its use: Volume 1 contains all the substances studied except pesticides; Volume 2 contains the pesticide citations.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
*Pesticides *Transport Properties *Soil Chemistry *Bibliographies Waste Disposal Contaminants Attenuation Adsorption	Pollutant Migration Ion Exchange	13B

18. DISTRIBUTION STATEMENT RELEASE TO PUBLIC	19. SECURITY CLASS (This Report) UNCLASSIFIED	21. NO. OF PAGES 235
	20. SECURITY CLASS (This page) UNCLASSIFIED	22. PRICE A11-A01

EPA Form 2220-1 (9-73)

U.S. GOVERNMENT PRINTING OFFICE 1979 -657-060/5452

EPA-600/9-79-024b
August 1979

MOVEMENT OF HAZARDOUS SUBSTANCES IN SOIL: A BIBLIOGRAPHY

Volume 2. Pesticides

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Interagency Agreement EPA-IAG-D4-F476

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This report has been reviewed by the Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency, and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement of recommendation for use.

FOREWORD

The Environmental Protection Agency was created because of increasing public and government concern about the dangers of pollution to the health and welfare of the American people. Noxious air, foul water, and spoiled land are tragic testimony to the deterioration of our natureal environment. The complexity of that environment and the interplay between its components require a concentrated and integrated attack on the problem.

Research and development is that necessary first step in problem solution and it involves defining the problem, measuring its impact, and searching for solutions. The Municipal Environmental Research Laboratory develops new and improved technology and systems for the prevention, treatment, and management of wastewater and solid and hazardous waste pollutant discharges from municipal and community sources, for the preservation and treatment of public drinking water supplies, and to minimize the adverse economic, social, health, and aesthetic effects of pollution. This publication is one of the products of that research; a most vital communications link between the researcher and the user community.

The Solid and Hazardous Waste Research Division contributes to these program objectives by conducting research to promote improved solid waste management. This report presents the results of a search of recent literature on transport, transformation, and retention in soil of selected hazardous substances.

Francis T. Mayo, Director
Municipal Environmental Research
Laboratory

ABSTRACT

This bibliography was prepared by the Toxic Materials Information Center (TMIC), Oak Ridge National Laboratory for the Solid and Hazardous Waste Research Division, EPA Municipal Environmental Research Laboratory, Cincinnati, Ohio. The bibliography is intended for use by personnel concerned, either via research or management, with the disposal of hazardous wastes, other than sewage sludge, on land. It is the result of a search of recent literature (1970 through 1974) and includes information on the transport, transformation and soil retention of arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, selenium, zinc, halogenated hydrocarbons, pesticides, and other hazardous substances. About half of the 2000 entries include an abstract. In order to limit the size of the resulting publication, the literature search focused on processes directly related to transport (adsorption, ion exchange, etc.) and documentation of the occurrence and extent of transport while specifically excluding topics such as uptake and translocation by plants, modeling, and effects on microorganisms and processes mediated by microorganisms. The bibliography has been divided into two volumes to facilitate its use; the pesticides citations have been placed in a separate volume.

In addition to the TMIC's own data files, the following sources were searched: Soils and Fertilizers Abstracts (1972-1974 plus bibliographies covering older material); Pollution Abstracts (1970-1974); Environment Abstracts, formerly Environment Access (December 1970-1974); Chemical Abstracts (1973-1974); Biological Abstracts and BioResearch Index (1970-1974); Nuclear Science Abstracts (1972-1974); U.S. Government Reports (1973-1974); Health Effects of Environmental Pollutants (1972-1974); Health Aspects of Pesticides Abstract Bulletin, now Pesticides Abstracts (1972-1974), and Industrial Wastes Information Bulletin (1973-1974). These sources, combined with other pertinent books, symposia, etc., should make this two-volume document representative of current information on movement of hazardous substances in soil.

Format for all citations in this document is not uniform; this is due, in part, to the merging of data bases without retyping citations. Each citation is complete, though the order of presentation may differ. This report was submitted in fulfillment of Interagency Agreement No. D4-F476 by Oak Ridge National Laboratories under the sponsorship of the U.S. Environmental Protection Agency. This report covers the period of April 25, 1974 to September 30, 1974.

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SECTION I

ABSTRACTS

1
Persistence and Degradation of Pesticides in the Environment

Part of Scientific Aspects of Pest Control, Report of a Symposium, National Academy of Science, National Research Council, Publication No. 1402, 221(1966); 1966

PERSISTENCE; DEGRADATION; PESTICIDES

2
Pesticides: Self - Destructing DDT

Chem. Eng. News, 48(1), 12-13; 1970

DEGRADATION; DDT; POWDERED ZINC; ETHANE; IRON; DDE; MICE; SPRINGTAILS; THIOPHOSPHATE; INSECTICIDES; MONTMORILLONITE; AROMATIC RINGS; CHLORINATED HYDROCARBONS; PESTICIDES

The degradation of DDT is the object of a research project at Aerojet General Corporation, sponsored by a $96,520 grant from the Federal Water Pollution Control Administration. Most effective to date has been a reaction of DDT with powdered zinc in 10% solutions of acetic acid or ammonium sulfate giving bis (P - chlorophenyl) ethane. Reduction with iron gives DDE. However, DDE is still quite harmful, but bis (P - Chlorophenyl) ethane is only 10% as toxic to mice as DDT. At Michigan State University work is continuing on biological approaches to the degradation of DDT. Springtails - species of the insect COLLEMBOLA - continue to show promise in experiments to find methods of degrading DDT in the field. Relatively large doses of DDT are harmless to springtails, which break DDT down to DDE. Field plot tests are now being conducted to determine predator relationships involving COLLEMBOLA. It has been shown that springtails carrying 100 ppm DDT in their tissue are fatal to their millipede predators. Work is also in progress at Michigan State with the cation exchange clay montmorillonite. After the ion exchange sites are filled with cupric ions, the clay absorbs and catalyzes degradation of many thiophosphate - type insecticides. Since aromatic compounds are also complexed by montmorillonite, methods of accomplishing degradation or aromatic rings in chlorinated hydrocarbon pesticides are sought.

3
Degradable Organophosphorus Pesticides

Chem. and Engineering News, 50, 20; 1972, April

DEGRADATION; ORGANOPHOSPHORUS PESTICIDES; MALATHION; PARATHION; WASHING; ANTICHOLINESTERASE PESTICIDES

A family of organophosphorus pesticides that function similar to malathion and parathion but that are readily degraded to nontoxic fragments has been developed by scientists at Edgewood Arsenal, Md., and Ash-Stevens, Inc., Detroit, Mich. Degradation of the pesticides is accomplished by simple washing with mildly alkaline reagents, the scientists claim. The principle of the pesticidal activity of the new family, outlined in U.S. Patent Application 11,876, is based on their anticholinesterase action.

4
Effect of Pesticides Residues and Other Organo-Toxicants on the Quality of Surface and Ground Water Resources

; Purdue University, Lafayette, IN

PB-211 080, TR-10, W72-11867, OWRR-A-005-IND(16), Water Resources Research Center, Purdue University, Lafayette, IN, 112 p.; 1970, June

PESTICIDES; RESIDUES; ORGANO-TOXICANTS; SURFACE WATER; GROUNDWATER; GROUND WATER; WATER

5
Processes, Procedures, and Methods to Control Pollution Resulting from Silvicultural Activities

; Environmental Protection Agency, Washington, DC

Report No. EPA-430/9-73-101; Monitoring Agency Rept No. W74-02946; 102p.; 1973, Oct.

WATER; RUNOFF; SOILS; THERMAL POLLUTION; LUMBERING; SOIL EROSION; INSECTICIDES; HERBICIDES; SURFACE WATER; REFORESTRATION; LAND USE; SEDIMENT RUNOFF; FORESTS; PESTICIDES; STREAMS; SOLAR RADIATION; LOGGING; TIMBER

This report provides information of a general nature regarding processes, proceedings, and methods for controlling pollution caused by sediment runoff from logging roads, skid trails, and other areas of disturbed soils in forest areas; pesticides and fertilizers used in forest regeneration activities; chemicals and other materials applied for forest fire prevention; and temperature increases in small streams exposed to solar radiation by logging of bordering timber stands. It is intended to act as a state-of-the-art document useful for the developement of effective programs to control nonpoint sources of pollution.

6
Monitoring Agricultural Pesticide Residues. A Preliminary Report of Studies on Soil, Sediment, and Water in Mississippi River Delta.

; United States of America Department of Agriculture, Agricultural Research Service, Plant Pest Control Division

Bulletin, US Department of Agriculture, ARS, 81-13, 53 p.; 1966

PESTICIDES; RESIDUES; SOILS; SEDIMENTS; WATER; ORGANIC PESTICIDES; ACCUMULATION

Normal pesticide use practices were investigated and samples of soil, sediment and water were analysed for residues in five 1-square-mile study areas. There was little or no progressive accumulation of any organic pesticide in the area.

7
Degradation of Several Herbicides in Red Alder Forest Floor Material

; Forest Service, USDA

Res. Prog. Rep. W. Soc. Weed Sci., 21-22; 1970

RESIDUES; AMITROLE; 2,4-D; PICLORAM; DEGRADATION; HALF-LIFE; DECOMPOSITION; LEACHING; OVERLAND FLOW; FORESTS; HERBICIDES; STREAMS; FOREST FLOOR

Analyses of herbicide residues in forest floor material (ALNUS RUBRA) showed amitrole and 2,4-D to be rapidly decomposed, while picloram was the most resistant to degradation (half life less than 9 months); 2,4,5-T was of intermediate persistence. The higher the herbicide's rate of decomposition, the lower the hazard of stream pollution (through leaching or overland flow). Percent recoveries of the herbicides from forest floor material 10-180 days after treatment are shown in a table.

8
Interaction of Herbicides and Soil Microorganisms

; Boyce Thompson Inst. for Plant Research, Inc., Yonkers, NY

Water Pollution Control Research Series; Monitoring Agency Rept. No. W72-13044, EPA 16060-DMP-03/71; Proj. EPA-16060-DMP; PB-211 566; 75 p.; 1971, March

ABATEMENT; WATER; PROPHAM; DCPA; BROMACIL; MONURON; ATRAZINE; DICAMBA; AMIBEN; DIURON; SOILS; HERBICIDES; BIODETERIORATION; PESTICIDES; CHLORINE; ADDITIVES; BACTERIA; HYDROLYSIS; PHTHALATES; CARBAMATES; URACIL; UREA; N-HETEROCYCLIC COMPOUNDS; FUNGI; DEGRADATION; IPC

The introduction of microorganisms with specific degradative capacities into the soil was shown to be a possible means of ridding the soil of contaminating chemicals. An investigation of the interactions of soil microorganisms and several groups of herbicidal compounds, primarily chlorinated derivatives, was made. In pure culture and in soils the addition of 2,3,5, 6-tetrachloroterephthalate (DCPA) had little effect upon bacterial growth, and several microorganisms appeared to use the herbicide as a carbon source. The encouragement of the soil microflora by the addition of nutrient broths resulted in a reduction of toxicity to plants of a number of herbicides. Isopropyl n-phenylcarbamate (IPC) degrading organisms, when added to soil, accelerated the degradation of IPC and related compounds. A membrane 'biologicalilter' device for reducing waterborne biodegradable pollutants was also demonstrated using these organisms.

9
Ground Disposal of Pesticides: The Problem and Criteria for Guidelines

; Working Group on Pesticides, Washington, DC

Working Group on Pesticides, Washington, DC; PB 197 144; WGP-DR-1; 1970, March

INDUSTRIAL WASTES; INDUSTRY; LANDFILL; LEACHING; LEACHATES; MINE SHAFTS; PESTICIDES; SOILS; WASTE DISPOSAL; WATER; DISPOSAL; WELL WATER; GROUND WATER; PERSISTENCE

The pollution of ground and well water by pesticides should be reduced by a careful consideration of their sources, physical chemical and toxicological persistancy and the hydrogeology of disposal sites.

10
Pesticide Residues: No Danger from Arsenic

Chem. Eng. News, 49(37), 8; 1971

FATE; PESTICIDES; CACODYLIC ACID; DIMETHYL ARSINE; GAS; SOILS; ALKYL ARSINES; FOOD CHAINS; ARSENICALS; DDT

The Plant Science Research Division of the U.S. Department of Agriculture released the results of tests on the fate of arsenical pesticides, particularly cacodylic acid, in soil on September 1, 1971. Cacodylic acid was found to disappear from the soil by two routes. The main route involves the formation of carbon dioxide and inorganic arsenic. The second route involves the formation of dimethyl arsine, which leaves the soil as a gas. Both routes are operative in very wet soils. Preliminary tests indicated that cacodylic acid and the alkyl arsines do not become biologically magnified in food chains. The use of arsenicals has increased as a result of restrictions on the use of DDT and other organics.

11
Pesticide Pollution of the Air

Chem. Eng. News 47(1), 42-3; 1969, January

PESTICIDES; AIR

12
Pesticides and the Environment

Pesticides, 6(12), 35-38; 1972

PESTICIDES; WATER; FISH KILLS; PHOTOSYNTHESIS; MARINE PHYTOPLANKTON; DDT; OCEAN; RESIDUES; STREAMS; ORGANOCHLORINES; GROUND WATER; HERBICIDES; BIRDS; SOILS

Most of the concern over the levels of pesticides in water has been generated by hasty reports of fish kills, of which only 2.5% have been attributed to pesticides in the U.S. Since 1960, and limited laboratory studies such as the one in which the photosynthesis of four marine phytoplankton was inhibited by levels of DDT 1000 times greater than those found in the ocean. Although it is a well-known fact that residues of pesticides enter water, a study by the U.S. Geological Survey indicated that no pesticide concentrations in excess of the limits permissible in public water supplies were present in streams in western U.S. Varying soil characteristics and the wide range of available pesticides make evaluation of the effects of these chemicals on soil difficult. Most often cited contamination of soil by persistent organochlorines is not necessarily an environmental problem since these chemicals generally do not move to ground water or streams except through transport on soil particles. Increasing yields on farms which extensively use herbicides indicates that soil fertility has not been damaged through the use of these pesticides. With the exception of four species of birds, wildlife has not been detrimentally affected by the use of pesticides. (12 references)

13
The Breakdown of Dieldrin in Soils

World Rev. Pest. Cont., 7(2), 68-69; 1968

BREAKDOWN; DIELDRIN; SOILS

14
Committee Recommends Continued Uses of Aldrin/Dieldrin

Chem., 135(7), 30; 1972

PESTICIDES; ALDRIN; DIELDRIN; WITHDRAWAL; AQUATIC; CARCINOGENS; VERTEBRATES; AIRCRAFT; FOLIAR APPLICATIONS; DUSTING; WATERWAYS; SETTLING PONDS; HUMANS; ANIMALS; PONDS; SOILS

The Aldrin/Dieldrin Advisory Committee's Report to the Environmental Protection Agency has approved the application of these pesticides directly to soil or to material buried in soil. It also recommended that the economic impact of total withdrawal of the two compounds BE explored in depth. Whereever economically feasible, alternate methods of control should be used, especially in aqueous environments. Also recommended was formation of a committee of experts in chemical carcinogenesis to determine the effect of dieldrin on at least two vertebrate species. Application by aircraft, foliar spraying or dusting, discharge or residues into waterways or settling ponds, use in housing for humans and animals, and use on turf except as supervised by trained persons should not be allowed. The environment should be monitored over a number of years to determine if the restrictions lead to progressive disappearance of dieldrin and aldrin.

15
Soil Insects Degrade DDT

Science News, 94(26), 642; 1968

SOILS; INSECTS; DEGRADATION; DDT

16
Effect of the Canal Irrigation System Used in the UAR on the Persistence of Soil Insecticide

Abdel-Gawaad, A.A.; Hamad, M.A.; El-Gayar, F.H.; Plant Protect. Dep., High Inst. Cotton Affairs, Alexandria, UAR

Int. Pest Contr. (IPCWAX) 13(4), 8-10, 28; 1971

IRRIGATION; PERSISTENCE; INSECTICIDES; DIPONATE; ENDRIN; CHLORDECONE; SOILS; BREAKDOWN PRODUCTS; LEACHING; CHLORINATED HYDROCARBONS; ORGANOPHOSPHORUS INSECTICIDES; DIPONATE; ENDRIN; CHLORDECONE

17
Linuron, Chlorbromuron, Nitrofen, and Fluorodifen Adsorption and Movement in Twelve Selected Illinois Soils

Abernathy, J.R.; Univ. Illinois, Urbana, Ill.

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-9861, Diss. Abstr. Int. B 1973, 33(10), 4616; 1972

LINURON; SOILS; HERBICIDES; CHLORBROMURON; NITROFEN; FLUORODIFEN

18
Effect of Calcium Chloride on Prometryne and Fluometuron Adsorption in Soil

Abernathy, J.R.; Davidson, J.M.; Agron. Dep., Oklahoma State Univ., Stillwater, Okla.

Weed Sci.(WESSA6), 19(5), 517-21; 1971

HERBICIDES; ADSORPTION; CALCIUM CHLORIDE; SOILS; PROMETRYNE; FLUOMETURON

In 2 water-saturated soils, Eufaula loamy fine sand and Norge loam, an increase in the Calcium chloride concentration from 0.01 to 0.5 N decreased and increased, resp., the adsorption of fluometuron (I) and Prometryne (II), which were applied to the soil. I mobility was unchanged by the 2 concentrations in Eufaula, but was greater in Norge loam at the higher Ca concentration. II adsorption was greater than that of I for both soils and each Ca concentration. In a flowing system, the retardation of each herbicide was less than that calculated from adsorption isotherm data, which may have resulted from a failure of the herbicide to reach an equilibrium with the soil during its displacement through the column.

19

Bentazon Mobility and Adsorption in Twelve Illinois Soils

Abernathy, J.R.; Wax, L.M.; Dep. Agron., Univ. Illinois, Urbana, ILL

Weed Sci. (WEESA6), 21(3), 224-227; 1973

BENTAZON; ION EXCHANGE RESIN; HERBICIDES; ADSORPTION; MOBILITY; TRANSPORT; SOILS

Investigations of the behavior of 3-isopropyl-1H-2, 1,3-benzothiadiazin-(4)3H-one 2,2-dioxide (bentazon) in water solutions have shown that it was anionic in neutral solutions by exhibiting a strong movement toward the anode in an electrical field. The herbicide was not adsorbed by any of twelve selected Illinois soils or by the cation exchange resin, carboxymethylcellulose (CMC), but was almost completely adsorbed by charcoal and by the anion exchanger, diethylaminoethylcellulose (DEAE). Bentazon moved with the water front on soil thin-layer plates as well as through soil columns.

20

Behavior of the Herbicides 2-KP and Trisben-200 in the Soil and their Effect on Attrition of the Roots of Rose Smartweed

Abramova, K.A.; Uskova, L.A.; USSR

Fiziol. Aktiv. Veshchestva. Respub. Mezhvedom. Sb. (D8MMYC) 1971, No. 3, 159-66; 1971

SMARTWEED; HERBICIDES; CARBOHYDRATE; PLANTS; TRISBEN-200; ROSE SMARTWEED; ROOTS; ROSES; MIGRATION; NECROSIS; SOILS

Trisben-200 was more effective against rose smartweed, and was more stable, than was 2-KP. Both herbicides readily migrated in the soil. Massive necrosis of smartweed roots was produced by depletion of their carbohydrate reserves to 10-12 mg/g dried roots, i.e., 10% of their initial content.

21

DDT in Residues in Orchard Soils

Ackley, W.B.

Wash. State Hor. Assoc, Proc., 46, 85-88; 1950

DDT; RESIDUES; SOILS; ORCHARDS

22

Metabolism of Organophosphorus Insecticides. 14 Malathion Breakdown by Soil Fungi

Adam, Y.; Bahig, M.R.; Fakhr, I.M.; Mostafa, I.Y.

Z. Naturforsch., 27B(9), 1115-1116; 1972

SOIL FUNGUS; WATER; METABOLITES; MALAOXON; MALATHION; CARBOXYESTERATIC; DESMETHYLATION; THIOPHOSPHATE; MONOMETHYL PHOSPHATE; MALATHION DIACID; MALATHION MONOACID; DIMETHYL PHOSPHATE; DIMETHYL PHOSPHOROTHIOATE; DIMETHYL PHOSPHORODITHIOATE

In an investigation of the degradation of 32P-malathion by three soil fungi, PENICILLIUM NOTATUM had the highest activity, hydrolyzing 76% of the compound in 10 days. Over the same time period ASPERGILLUS NIGER produced water soluble metabolites accounting for 59% of the dose and also a small amount of malaoxon. RHIZOCTONIA SOLANI was completely inhibited at the level of malathion used. Even after the dose was reduce, only a small amount of degradation was observed. Very active carboxyesteratic hydrolysis as well as desmethylation was indicated in P. NOTATUM and A. NIGER. Identified water soluble metabolites were thiophosphate, monomethyl phosphate, malathion diacid, malathion, dimethyl phosphorodithioate. (15 references)

23

Managing Our Environment. A Report on Ways Agricultural Research Fights Pollution

Adams, [illegible].M.; Bollt, E.D.; Enlow, R.E.; Funderburk, R.W.; Gall, M.; Griffin, D.P.; Hutchinson, W.D.; Kelly, E.M.; Picardi, R.E.; Foe, F.A., Jr.

U.S. Dep. Agric. Agric. Inf. Bull., 351, 1-48; 1972

GRASS; SOILS; PESTICIDES; AGRICULTURE

24

Effect of Soil Organic Matter on the Movement and Activity of Pesticides in the Environment

Adams, R.S.; Soil Sci. Dep., Univ. Minnesota. St. Paul, Minn.

Part of the Fifth Annual Conference on Trace Substances in Environmental Health, University of Missouri, Columbia, 1971 (p. 81-93); 1972

MOVEMENT; REVIEW; PESTICIDES; SOILS; ORGANOCHLORINE INSECTICIDES; TRAIZINE; HERBICIDES; ORGANIC MATTER; INSECTICIDES

A review on the influence of soil organic matter on the movement and activity of organochlorine insecticides and triazine herbicides. (54 references)

25

Factors Influencing Soil Adsorption and Bioactivity of Pesticides

Adams, R.S.; Dep. Soil. Sci., Univ. Minnesota, St. Paul, Mn

Residue Rev. (RREVAM) 1973, 47, () 1-54; 1973

REVIEW; PESTICIDES; BIOACTIVITY; SOILS; ADSORPTION; MICROCLIMATE

A review with 216 references factors which influence the adsorption and bioactivity of pesticides in soil. Chemical properties of pesticides, soil microclimate, and soil properties, are discussed.

26

Picloram Enhances 2,4-D Movement of Field Bindweed-D

Agbakoba, C.S.O.; Goodin, J.R.

Weed Sci 18 (1). 1970 19-21.

HERBICIDES; WEEDS; MOVEMENT; 2,4-D; PICLORAM

27
A Study of Residues of "Preventive" Herbicides in Vine Soils.

Agulhon, R.; Inst. Tech. Vin. Nizes, France

Progr. agric. vitic. 169, 184-189; 1969

SIMAZINE; SOILS; CHLORTHIAMID; DECOMPOSITION; DICHLOROBENZAMIDE; VINEYARD; RESIDUE

Simazine was applied to a vineyard soil for up to 6 years and chlorthiamid for 1 year. No appreciable residues of simazine were found at depths below 10 cm in the soil, but the surface layer contained sufficient residues to cause leaf symptoms.. Following chlorthiamid treatment, the toxic decomposition product dichlorobenzamide moved into the lower layers of the soil, where it is considered a possible danger to the healthy growth of vines.

28
Effect of Pesticide Residues and Other Organotoxicant on the Quality of Surface and Ground Water Resources

Ahlrichs, J.L.; Chandler, L.; Monke, E.J.; Reuszer, H.W.

PB Report 211080; 1970

PHORATE; CARBARYL; ORGANOTOXICANT PESTICIDES; WATERSHEDS; WATER; RUNOFF; STORMS; SURFACE WATER; SORPTION; PESTICIDES; RESERVOIRS; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS

The amount of phorate and carbaryl organotoxicant pesticides applied to a watershed which were lost from the application site into the water system depended on the occurrence of runoff-producing storms shortly after application. Bacteria were found which could break the ring structure of carbaryl, but data concerning the role of microorganisms in the elimination of organotoxicants from surface water were variable. The physico-chemical effects of soil constituents on the sorption reactions of the toxic substances, bacterial degration of the pesticides in reservoirs, terrestrial and aquatic indicator organisms which denoted the presence or effect of the substances, and feasible methods for removal of the substances already in the water system are discussed.

29
Longevity of Residues of 4 Organophosphate Insecticides in Soil

Ahmed, N.; Morrison, F.O.; Macdonald College, Quebec, Canada

Phytoprotection 53 (2-3), 71-74; 1972

CHLORFENVINPHOS; FENSULFOTHION; DIAZINON; DYFONATE; SANDY LOAM; SOILS; ORGANOPHOSPHATES INSECTICIDES; INSECTICIDES; RESIDUES

The active ingredient in granular formulations of chlorfenvinphos, fensulfothion, diazinon, and dyfonate added to chicot sandy loam soil in microplots disappeared more rapidly in the field than in the greenhouse. Persistence of the residues, measured by the mortality of euxesta notata larvae exposed to the treated soil, was greatest for dyfonate and less for diazinon, fensulfothion, and chlorfenvinphos in that order. At 6 lbs/a dyfonate persisted for 28 weeks in the field and for 17 weeks in the greenhouse while chlorfenvinphos was detectable for 5 weeks and 3 weeks under the respective conditions. Differences in test organisms may account for some differences in the order of persistence, found when results are compared with previously persistent in the greenhouse.

30
Long-Lived Pollutants in Sediments from the Laguna Atascosa National Wildlife Refuge, Texas

Ahr, W.M.; Dep. Geol., Texas A And M Univ., College Station, Tex.

Geol. Soc. Amer. Bull. (BUGMAF) 1973, 84(8) 2511-15; 1973

DDT; SOILS; LEAD; ARSENIC; ORGANOCHLORINE INSECTICIDES; INSECTICIDES; SEDIMENTS

31
Rentention Times for Residual Amounts of Carbathion in Soil

Akishina, T.M.; Inst. Microbiol. Lvov, U.S.S.R.

Faktory Venshn. Sredy i ikh Zanechendli Zdrov'ia Naselen No. 1, 136; 1969

CARBATHION; SOIL; LOAM; RETENTION; RESIDUES

Application of 3% carbathion solution (200 ml/m squared) was made to a loam. After a few hours and on days 1, 3, 4 and 5, carbathion in soil amounted to 70, 30, 28, 15 and 3% respectively; no residues were detected in the arable layer or the 6th day.

32
Hygienic Soil Studies in Connection with Use of 2,4-D Herbicide

Aksenov, V.B.; Poluboyarinova, I.V.

Gig Sanit 35 (3), 102-103; 1970

CONVERSION; RESIDUES; 2,4-D; HERBICIDES; SOILS

33

Nonbiodegradable and Other Recalcitrant Molecules

Alexander, M.; Lab. Soil Microbiol. Dept. Agronomy, Cornell Univ., Ithaca, N.Y. 14850

Biotechnol. Bioengineering, 15(4), 611-647; 1973

RESISTANCE; DEGRADATION; MICROORGANISMS; ORGANIC MATTER

Many natural products show remarkable durability in natural ecosystems, and some of these substances are of great practical concern. A variety of types of synthetic compounds are also persistent in nature, and this resistance is of importance because of the large amounts of such chemicals now manufactured and their effects in a variety of environments. The degradation of synthetic chemicals results mainly from activities of microorganisms, and attempts to minimize pollution of water and soil would be facilitated were there adequate information on why many pollutants are so refractory. Unfortunately, little is known about why manmade or even natural organic compounds are not destroyed at rates sufficiently repaid to prevent appreciable accumulations and occasionally ecological disturbances of considerable proportions. Environmental protection requires that a synthetic chemical should be converted to inorganic products in a reasonably short period of time. The material should, of course, not be subject to biodeterioration during the period it is being used for its intended purpose, but it should be destroyed once it is no longer needed and is introduced into waters, soils, or other disposal sites. Biodegradability of a compound often can be increased by appropriate structural modifications. These modifications can lead to replacement of compounds or manufactured products potentially dangerous in natural ecosystems and some that are undesirable for asthetic reasons with others which do not last sufficiently long in nature to be either hazardous or offensive. The cost of manufacture may be increased because of the additional requirement for biodegradability, but if society wishes to enjoy the benefits it now obtains from synthetic chemicals and yet have an environment free of toxic or offensive materials, it will have to accept the possible burden of additional cost. On the other hand, adequate knowledge of the mechanisms of recalcitrance may allow not only for a sound approach to the development of new chemical products but lead to new materials that can be produced with little or no added cost.

34

Microbial Aspects of Soil Pollution

Alexander, M.; Cornell University, Ithaca, NY

Part of Westley, B. (Ed.), Proceedings of International Symposium on Identification and Measurement of Environmental Pollutants. Held at Ottawa, Ontario, Canada, June 14-17, 1971 (p. 78-80), 449p.

MICROBES; MICROORGANISMS; SOILS; PESTICIDES; HERBICIDES; BIODEGRADATION; NITRATES; FEED LOTS; SOLID WASTES; MANURE; HEAVY METALS; ARSENIC; MERCURY; FUNGICIDES; WATER; GROUND WATER; ALGAE; ALGAL BLOOMS; PROCESSING WASTES; NITROGEN; ORGANOPHOSPHATES; CHLORINATED HYDROCARBONS; PERSISTENCE; OXYGEN; DETOXIFICATION; PLANT PATHOGENS; METHYLATION; ARSENIC; SELENIUM; METHYLMERCURY; SPINACH; NITRATE ACCUMULATORS; FERTILIZERS

Microorganisms are important is soil pollution .

The degradation of organic pesticides and other synthetic compounds results largely from microbial acivity, but in the decomposition new products are formed. These breakdown products may be toxic or persistent, thus creating new hazards. Various classes of pesticides are not destroyed at significant rates by soil microorganisms, and they are therfore long-lived frequently they ultimately enter bodies of water. Certain changes in these molecules make them more readily biodegradable. Microorganisms play a unique role in the destruction of solid wastes from agriculture, industry, and the home, but problems arise because many of these wastes are not quickly digested by microorganism. The microbial conversion of nitrogenous materials, including fertilizers, into nitrate constitutes another environmental problem. Finally, the impact of pollutants on the essential biological transformations in soil is considered.

35

Microbial Degradation of Pesticides

Alexander, M.

Part of Matsumura, F.G., Boush, M. and Misato, T. (Ed.), Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. CISO, Japan, October, 1971, Academic Press; New York, NY, London, England, (p. 365-383) 637 p.; 1972

INSECTICIDES; MICROBIOLOGY; DEGRADATION

36

Microbial Degradation of DDT

Alexander, M.; Cornell Univ. Ithaca, NY, Dept. of Agronomy 40208

Annual Report No. 1, July 1, 1972 - June 30, 1973; Cornell University; AD-762469; Proj. NR-306-067; Contract N00014-67-A-0077-0027; Monitoring Agency Rept No. 18(1), 26 p.; 1973, July

BIODETERIORATION; PHYCOMYCETES; SEDIMENTS; DDT; DEGRADATION; CHEMICAL ANALYSIS; BACTERIA; SAMPLING; METABOLISM; SEA; MICROBIOLOGY; INSECTICIDES; WATER; SEACOAST; NITROGEN

Over 110 marine bacteria were isolated and tested for their ability to convert DDT to water-soluble products. Forty-seven were found to convert 5% to 10% of the Carbon 14-DDT to water-soluble products, 38 solubilized less than 5% of the insecticide, and 29 were apparently inactive by the test methods employed. MUCOR ALTERNANS, a fungus exceptionally active in producing water-soluble metabolites from DDT, was used as a model for determining the identities of the water-soluble metabolites. Although these compounds have not yet been identified, they are not DDT, DDA, DBH, DBP, PCPA, or 2-chlorosuccinic acid. Therefore, previously uncharacterized products are probably formed by MUCOR ALTERNANS. The hypothesis that nutrient availability is limiting DDT degradation is now being tested. For this purpose, natural microbial communities of sea water containing bottom sediments are being subjected to a large number of different treatments in an attempt either to enrich for DDT-degrading organisms or to provide the conditions necessary for rapid DDT decomposition.

37
Biochemical Ecology of Microorganisms

Alexander, M.

Annu. Rev. Microbiol., 25, 361-392; 1971

MICROORGANISMS; DDT; DEGRADATION; 2,4-D; METALLIC MERCURY; MERCURY; SOILS

Pesticide biochemistry elucidates how microorganisms contribute to environmental deterioration of pollutants. Several individual cultures metabolize DDT. HYDROGENOMONAS SP. effects initial steps of DDT degradation anaerobically and, with the addition of oxygen, cleave the ring and form P-chlorophenylacetic acid. Other microorganisms further degrade this product. Steps involved in the complete mineralization of 2,4-D have been established for arthrobacter, but knowledge of metabolism in nature is lacking. Microorganisms are responsible for the release of metallic mercury from mercurials in soil. The metabolism of polluting chemicals in nature, neutral selection, the effect of environment on microorganisms, the effect of microorganisms on their surroundings, and the biochemistry of interspecific relationships among microorganisms are also discussed. (213 references)

38
Persistence of BHC, DDT, and Toxaphene in Soil and the Tolerance of Certain Crops to Their Residues

Allen, W.

U.S.D.A. Tech. Bull., 1090; 1954

PERSISTENCE; BHC; DDT; TOXAPHENE; SOILS; CROPS; RESIDUES

39
Dissipation of Dicamba from Grassland Soils of Texas

Allen, T.J.; Texas A & M Univ., Dept. of Range Science, College Station, TX 77843

Weed Science, 21(5), 393-396; 1973, September

ORGANOCHLORINE HERBICIDES; RESIDUES; SOILS; DICAMBA; DISSIPATION; GRASSLAND; HERBICIDES; SEMIARID GRASSLAND

Dicamba dissipated in 4 weeks and in 9.16 weeks when sprayed on grassland soils of Texas at 0.28 and 0.56 kg/ha, respectively. At 3 of 4 locations ranging from humid to semiarid and from clay to sandy loam and sampled from 9 to 63 weeks after treatment, usually residues were no deeper than 120 cm and never deeper than 150 cm. Dicamba residues were detected 120 cm deep 53 weeks after appplication of granules at 1.68 or 2.24 kg/ha to sand of semiarid grassland. Since dicamba sprays are usually applied at less than 0.56 kg/ha for grassland restoration in Texas, it is unlikely that residues of dicamba will persist in soil through the growing season from spring applicatons.

40
Soil Disinfectant Compositions

Almassy, G.; Zador, G.; Syko, M.; Abafy, J.; Antal, J.; Orsanyi, M.I.; Somogyi, M.S.; Varju, B.; Csapo, I.

Hung. Teljes(HUXXBU) 1973, 18 Pp.; 1973

TRICHLORFON; FERTILIZERS; SOILS; INSECTICIDES; STORAGE; STABILITY; DISINFECTANT

Mixing with fertilizers (PH less than 5) increased the storage stability, and insecticidal effect in soil, of trichlorphon.

41
Degradation of Dicamba, Picloram, and Four Phenoxy Herbicides in Soils

Altom, J.D.; Stritzke, J.F.; Agron Dep., Okalhoma State Univ., Stillwater, Ok

Weed Sci. (WEESA6) 1973, 21(6) 556-60; 1973

HERBICIDES; DEGRADATION; SOILS; DICAMBA; PICLORAM; HALF-LIFE; 2,4-D; 2,4,5-T; SILVEX; DICHLORPROP; VEGETATION; OAK BRUSH; OAK; PHENOXY HERBICIDES

The average half-life for 2,4-D, dichlorprop, silvex, 2,4,5-T, dicamba, and picloram in 3 soil types was 4, 10, 17, 20, 25 and greater than 100 days, respectively. 2,4-D degradation was not influenced by soil type or vegetative cover. The best herbicide treatment for oak brush control was a 2,4-D-dichlorprop mixture.

42

The Influence of Soil Arsenic on the Growth of Lowbush Blueberry

Anastasia, F.B.; Kender, W.J.; Procter & Gamble Co., Industrial Chemicals Div., Cincinnati, OH 45217

Journal of Environmental Quality, 2(3), 335-337; 1973

ARSENIC; INSECTICIDES; RESIDUES; PLANTS; GROWTH: SOILS; BLUEBERRY; CALCIUM ARSENATE

Samples of commercial and virgin soils taken from various lowbush blueberry (VACCINIUM ANGUSTIFOLIUM) areas in Maine contained measurable amounts of arsenic. The highest levels were in soils from commercial fields which had been treated repeatedly with calcium arsenate for insect control. The amount of arsenic decreased as the soil depth increased. Soils from commercial blueberry fields ranged from 7.7 to 37.8 ppm while virgin soils ranged from 5.7 to 7.0 ppm in the upper levels. Lowbush blueberry plants grown at arsenic levels of 7.7, 17.1, 43.8, 69.5 and 84.5 ppm in a loamy sand in the greenhouse were injured only at the highest level. At greater than or equal to 9.5 ppm arsenic blueberry plant growth was significantly inhibited when compared to plants grown at 7.7 ppm arsenic. The greatest arsenic accumulation in blueberry tissue occurred in the roots with decreasing amounts in the stems and leaves, respectively. When foliar arsenic reached 6.7 ppm, a significant reduction in plant growth resulted. Although arsenic was present in all field soils analyzed, at no point did the amount exceed that which was necessary to produce a reduction in plant growth under greenhouse conditions.

43

Factors Influencing Insecticide Degradation by a Soil Fungus, MUCOR ALTERNANS

Anderson, J.P.; Univ. Wisconsin, Madison, Wis.

(DABSAG) 1971, 118 Pp.; 1971

SOILS; FUNGUS; INSECTICIDES; DDT; DIELDRIN; DEGRADATION

44

Effect of Various Soil Fungi and Insecticides on the Capacity of MUCOR AL ALTERNANS to Degrade DDT

Anderson, J.P.; Lichtenstein, E.P.; Dep. Entomol., Univ. Wisconsin, Madison, Wis.

Can. J. Microbiol.(CJMIAZ) 1972, 18(5) 553-60; 1972

FUNGUS; INSECTICIDES; SOILS; DDT; DEGRADATION

Some isolated soil fungal species inhibited the capacity M. ALTERNANS to degrade Carbon-14-labeled DDT to water-soluble metabolites. The addition of various fungi to DDT-treated M. ALTERNANS cultures resulted in the depression of the appearance of water-soluble metabolities, due to accumulation of the metabolites in the mycelium of the other fungus, or to an inhibition of metabolite formation. In tests carried out with excretory products of fungi, only those from ASPERGILLUS FUMIGATUS and M. MUCEDO showed inhibition of DDT degradation by an M. ALTERNANS culture. Among the insecticides and related compounds tested, only lindane, parathion, and dyfonate caused a redness in DDT degradation by M. ALTERNANS, without severely reducing its vegetative growth.

45

Effect of Nutritional Factors on DDT Degradation by MUCOR-ALTERNANS

Anderson, J.P.; Lichtenstein, E.P.

Can. J. Microbiol., 17(10), 1291-1298; 1971

INSECTICIDES; DDT; DEGRADATION

46

Activity of Triazine Herbicides in Manitoba and Ontario Soils

Anderson, J.R.; Univ. Guelph, Guelph, Ont.

(DABSAQ) 1971, No Pp. Given; 1971

TRIAZINE; HERBICIDES; SOILS

47

Growth Characteristics of a Species of Lipomyces and its Degradation of Paraquat

Anderson, J.R.; Drew, E.A.

J. Gen Microbiol., 70(1), 43-58; 1972

SOILS; HERBICIDES; ADDITIVES; MINERALS; NUTRIENTS; GROWTH; DEGRADATION; PARAQUAT

48

Studies on the Degradation of an Isoxazolone Fungicide by Pure Cultures of Soil Bacteria

Anderson, J.R.; Horsgood, R.K.

Soil Biology and Biochemistry, 3(4), 271-280; 1971

DEGRADATION; ISOXAZOLONE; FUNGICIDES; SOILS; BACTERIA; DRAZOXOLON; NITROGEN; PESTICIDES; ENZYME

Soils enriched with 4-(2-chlorophenylhydrazone)-3-methyl-5-isoxazolone (drazoxolon) yielded 70 bacterial isolates capable of degrading this fungicide. An AEROBACTER CLOACAE-like organism and a nonfluorescent PSEUDOMONAS sp. used the compound as a sole source of nitrogen giving rise to 2-(2-chlorophenylhydrazone)-aceto-acetic acid (metabolite drazoxolon) and O-chloraniline. The type of energy source influenced the degradation, glucose repressing its extent and rate. Both organisms were capable of degrading the fungicide at concentrations ranging from 4.2 X 1E-4M to 2.1 x 1E-2M and both isolates also degraded commercial formulations of the fungicide. Crude enzyme preparations were capable of degrading the pesticide to metabolite drazoxdon only.

49
Fate and Carryover Properties of Temik Aldicarb Pesticide (2-Methyl-2-(Methylthio) Propionaldehyde O-(Methylcarbamoyl) Oxime) in Soil

Andrawes, N.R.; Bagley, W.P.; Herrett, R.A.; Research and Development, Dept. of Chemicals and Plastics, Union Carbide Corporation, Clayton, North Carolina

Journal of Agricultural and Food Chemistry, 19(4), 727-730; 1971

TEMIK ALDICARB PESTICIDE; PESTICIDES; PROPIONALDEHYDE; SOILS; SANDY LOAM; POTATOES; ALDICARB; ALDICARB SULFOXIDE; ALDICARB SULFONE; RAINFALL; DISSIPATION

3.4 kg/ha S-methyl-Carbon 14 aldicarb was applied to Norfolk sandy loam planted with potatoes or left fallow. After 90 days no aldicarb was detected in either cultivated or fallow soil and only 0.07 and 0.05 ppm, respectively, of transformation products were detected. Aldicarb sulfoxide, aldicarb sulfone and water-soluble metabolites were the principal transformation products. Maximum dissipation rates were associated with heavy rainfalls at various times during the growing season.

50
Metabolism and Residues of Temik Aldicarb Pesticide in Cotton Foliage and Seed Under Field Conditions

Andrawes, N.R.; Romine, R.R.; Bagley, W.P.; Res. Dev. Dep., Union Carbide Corp., South Charleston, W. Va.

J. Agr. Food Chem.(JAFCAU) 1973, 21(3) 379-86; 1973

ALDICARB; PESTICIDES; COTTON; RESIDUES; METABOLISM

51
Retention of Mercury by Soils. 1. Mercury Residues of Paddy and Orchard Soils

Aomine, S.; Kawasaki, H.; Inoue, K.

Soil Sci. Pl. Nut., 13, 186-188; 1967

SOILS; LEACHING; CLAY; SILT CLAY; MONTMORILLONITE; PHENYLMERCURIC ACETATE; ADSORPTION; COLLOIDS; ALLOPHANE; KAOLINITE; MERCURY

Mercury residues were confined to the surface layer in some soils; in other soils much mercury occurred in the subsoil. Apparently the leaching of mercury is related to the clay content of the soil and the mineralogical composition of the clay. Considerable leaching occurred in a silt clay soil in which montmorillonite predominated. Soils can retain phenylmercuric acetate by adsorption by colloids, particularly mineral colloids. Montmorillonite adsorbs phenylmercuric ions and also phenylmercuric acetate as a monolayer in interlayer spaces, with expansion of the basal spacing. In comparison with montmorillonite, allophane adsorbs less phenylmercuric acetate, and adsorbed mercury was easily removable by leaching, probably because of its low negative charge. Kaolinite adsorbs very little mercury, due to its small surface area and low negative charge.

52
Biochemistry of Iron in Soil

Aristovskaya, T.V.; Zavarzin, G.A.; Tsentral'nyi Muzei Pochvovedeniya imeni V. V. Dokuchaeva, Leningrad, USSR

Part of A. D. McLaren, J. Skujins (Eds.), Soil Biochemistry, Vol. 2 New York, Marcel Dekker, Inc. p. 385-408

REVIEW; IRON; BIOCHEMISTRY; SOILS; TRANSFORMATION

A review, with 102 references, of iron bacteria and iron transformation.

53
Preliminary Studies on the Adsorption of Arsenite in Punjab and Haryana Soils

Arora, S.K.; Singh, M.; Vaid, K.K.

Indian J. Sci. Ind., 1, 139-141; 1967

ADSORPTION; ARSENITE; SOILS; ORGANIC MATTER; CLAY SESQUIOXIDES; ARSENIC

The adsorption of arsenic by soils was affected mainly by organic matter, but also by clay percentage and amount of sesquioxides.

54
Residual Amounts of Simazine in the Soil and in Different Organs and Parts of Apple Trees

Arshidinov, A.A.; Isin, M.M.; Kaz. Nauchno-Issled. Inst. Plodovod., Vinograd., Ussr

Izv. Akad. Nauk Kaz. Ssr, Ser. Biol.(Ikabar) 1973, 11(2) 30-3; 1973

SIMAZINE; RESIDUES; SOILS; APPLES; TREES

55
Response of Soil Algae to Picloram 2,4-D Mixtures

Arvik, J.H.; Willson, D.L.; Darlington, L.C.

Weed Sci 19 (3). 1971 276-278

HERBICIDES; GROWTH; INHIBITION; SOILS; ALGAE; PICLORAM; 2,4-D

56
Influence of Some Soil Characteristics on the Dissipation Rate of Landrin Insecticide

Asai, R.I.; Gunther, F.A.; Westlake, W.E.; Citrus Research Center and Agricultural Experiment Station, University of California, Riverside, Calif. 92502

Bulletin of Environmental Contamination and Toxicology, 11(4), 352-358

SOILS; DISSIPATION; LANDRIN; INSECTICIDES; PERSISTENCE; HALF-LIFE; BREAKDOWN; HYDROLYSIS

The rates of dissipation of Landrin from nonsterile soils were primarily dependent upon the soil type. The persistence half-lives of the Landrin applied ranged from less than 4 to greater than 40 days in the 8 soils investigated. Rates of breakdown increased with increasing soil pH (above pH 7), indicating alkaline hydrolytive microorganisms were also involved, however. Soil organic matter did not seem to be a major factor in Landrin degradation.

57
Movement of Herbicides in Soil with Simulated Furrow Irrigation

Ashton, F.

Weeds, 9, 612-619; 1961

MOVEMENT; HERBICIDES; FURROW IRRIGATION;IRRIGATION; SOILS

58
Organic Chlorine as an Index of Soil Contamination

Atabaev, S.H.

Gig. Sanit., 10(5), 79-81; 1966

CHLORINE; SOILS; ORGANOCHLORINES

59
The Stability of the Pesticide Aldrin Under the Conditions of a Hot Climate

Atabaev, S.H.; Khasanov, I.U.; Kazarova, L.S.

Gigiena I Sanit., 35(4), 108-109; 1970

ALDRIN; COTTON SEED; SOILS; COTTON; RESIDUES; AIR-DRIED; AERIAL APPLICATION; LEACHING; IRRIGATION; PERSISTENCE; LOAMY; PASTURE-MARSHLAND; SANDY LOAM; RESERVOIRS; ACCUMULATION; WATER; MIGRATION

In connection with the use of aldrin as a cotton seed treatment in 1964-1965, a hygienic evaluation of the stability of the compound in various types of soils in the Uzbek, USSR was undertaken. Soil from four provinces was studied: Tashkent, Andizhan, Fergana and Khorezm. In Andizhan province and Fergana, aldrin had been used for 2 years both as a seed dressing and as an aerial treatment for cotton. Soil samples were taken at depths of 0 to 30 and 70 to 100 cm at different times after application. The results are charted and show that aldrin contaminated the upper layers predominantly. After 75 days, aldrin residues were 0.15 mg/kg of air-dried soil in the upper layer and three times less in the deeper layer. Residues were still present at 100 days but had disappeared after 20 months. Aerial application led to greater aldrin contamination of the soil. Its disappearance was explained by the high temperatures, microbiological processes, plant assimilation and leaching during irrigation. Aldrin persistence was found to depend on the soil type. In Uzbekistan, the same dose of aldrin left higher residues in pasture-marshland soil than in loamy or sandy loam type soils, organic matter in the soil apparently playing a role. Studies in 1965 in Andizhan, Kashka Darya and Syrdarya provinces, where aldrin had been used in 1964, showed significant residue pollution of the soil and migration of the residues into the deeper layers of the soil. After 2 years, self-cleansing of the upper layers had occurred but aldrin could still be detected in the 70- to 100-cm layers up to 5 years later and longer. Most agriculture in Uzbekistan is done by irrigation farming; the aldrin soil residues have acted as secondary sources of pollution of irrigation reservoirs in every instance. The survey has shown that aldrin is stable in a hot climate; soil self-cleansing occurs in the upper layers after 2 years and in the 70- to 100-cm soil layer after 5 or more years. Aldrin residue accumulation depends on the soil type and it does migrate to deeper layers, from whence it may serve as a source of secondary pollution of open bodies of water.

60
A Review of Sodium Monofluoroacetate (Compound 1080): Its Properties, Toxicology, and Use in Predator and Rodent Control

Atzert, S.P.; Division of Wildlife Service, Bureau of Sport Fisheries and Wildlife, Washington, D.C.

U.S. Fish Wildlife Service, Bureau Sport Fisheries Wildlife, Special Science Report, Wildlife, 146, 1-34; 1971

NAMFA; SODIUM MONOFLUORACETATE; ABSORPTION; DISTRIBUTION; ANIMALS; DETOXIFICATION; EXCRETION; TOLERANCE; ACCUMULATION; POISONING; TRANSLOCATION; PERSISTENCE; PLANTS; WILDLIFE; REVIEW; PREDATOR CONTROL; RODENT CONTROL

Early research on NaMFA (sodium monofluoracetate), its occurrence in nature, physical and chemical properties, absorption, and distribution, mode of action, toxicity in animals, latent period, detoxification and excretion, tolerance and accumulation, secondary poisoning, treatment of NaMFA poisoning, translocation and persistence in soil and plants, and the use of NaMFA in the United States, as a bait for predators on wildlife are reviewed.

61
Conversion of DDT to DDE by two Mite Species

Aucamp, J.L.; Butcher, J.W.; Michigan State University, East Lansing, Michigan

Revue d'Ecologie et de Biologie du Sol 8(4) 635-638; 1971

DDT; DDE; MITE; DIGESTIVE TRACT; CONVERSION

DDT entering the digestive tract of CALOGLYPHUS KRAMERI with contaminated food was rapidly converted to DDE. RHIZOGLYPHUS ROBINI, collected from the same habitat, was poorly adapted for this function and yielded only minute quantities of DDE.

62

Systemic Transfer of 32P-Labelled Fensulfothion from Soil into Pasture Plants: A Note

Avrahami, K.; Wallaceville Anim. Res. Cent., Min. Agr. Fish., Private Bay, Upper Hutt, N. Zealand

New Zealand J. Exp. Agr. 1(2), 203-206; 1973

PHOSPHORUS; FENSULFOTHION; SOILS; PLANTS; CLOVER; RYEGRASS; UPTAKE; ABSORPTION

In pot trials, 32P-labelled fensulforthion was taken up from treated soil by white clover and ryegrass and converted to hydrolysis products. The rate of uptake was about twice as high in ryegrass as in white clover and with each pasture plant about 4 times as much was absorbed after an application equivalent to 44 kg/ha as after 22 kg/ha. In soil only 4.5% of the radioactivity was hydrolyzed in 40 days, and fensulfothion and fensulfothion sulfone were the only significant residues. Plants contained fensulfothion, fensulfothion sulfone, fensulfothion oxygen analog sulfoxide and sulfone plus noncholinergic hydrolysis products. The hydrolyte fraction accounted for about 33% of the radioactivity in 10- to 14-day-old plants about 50% in 22- to 29-day-old plants. (3 references)

63

Soil Pollution by Organophosphorus Pesticides

Baida, T.A., Jr.

Zdravookhr. Kazakstana, 30(7), 72; 1970

PERSISTENCE; ORGANOPHOSPHORUS; PESTICIDES; CABBAGE; CHLOROPHOS; TRICHLORFON; PHOSPHAMIDE; WOFATOX; METAPHOS; METHYL PARATHION; DUST; RESIDUES; PHOTOELECTRIC CALORIMETRY; LEACHING; ORGANOPHOSPHORUS PESTICIDES; ACCUMULATION; CONTAMINATION; SOILS

The persistence of organophosphorus pesticides in the soil was investigated on irrigated plots of the experimental station of the Kazak Institute of Plant Protection. The soil was dark chestnut. The cabbage crop was treated four to five times during the growing season and irrigated six to eight times. Soil samples were taken from the 0- to 10-cm and the 10- to 20-cm horizons 15, 30 and 60 days after the last treatment. The cabbage had been treated in June to August: 1200 L/HA 0.2% chlorophos (trichlorfon) during the second or third 10-day period in June and 800 L/HA 0.2% phosphamide and 25 kg/ha 2.5% wofatox (metaphos; methyl parathion) dust during the middle of July and the second or third 10-day period in August. Soil residues were determined after the method of T.G. Golubev (1964) which is detailed (photoelectric calorimetry). The results of the study showed that the organophosphorus pesticides rapidly disappeared from the soil because of the high organic matter content. Chlorophos disappeared the most rapidly and could not be detected 15 days after treatment. Metaphos (0.88 mg/kg) could still be detected 2 weeks after the second treatment of the cabbage but by 4 weeks it could not be determined. The most persistent was phosphamide which was found up to 60 days after the second treatment in 4- to 5-mg/kg amounts. There was insignificant leaching of the pesticides to the lower-lying soil horizons. The rapid disappearance of these organophosphorus pesticides excluded their accumulation and contamination of the soil. The greater part of the applied chemicals stayed in the upper soil horizons.

64

Factors Influencing the Adsorption Desorption and Movement of Pesticides in Soil

Bailey, G.W.; White, J.L.

Part of Gunther, F.A. (Ed.), Residue Reviews, Vol. 32, Tirazine Herbicides, Symposium, Springer-Verlag, New York, N.Y., Heidelberg, West Germany, (p. 29-92) 413p.; 1970

INSECTICIDES; HERBICIDES; ADSORPTION; DESORPTION; MOVEMENT; SOILS

65

Review of Adsorption and Desorption of Organic Pesticides by Soil Colloids with Implications Concerning Pesticide Bioactivity

Bailey, G.W.; White, J.L.

J. Agr. Food Chem., 21, 324; 1964

REVIEW; ADSORPTION; DESORPTION; PESTICIDES; SOILS

66

Environmental and Edaphic Factors Effecting the Detoxication and Subsequent Degradation of a Herbicide, Butachlor

Baird, D.D.; Univ. Tennessee, Knoxville, Tn

Thesis, University of Tennessee, Knoxville, Tennessee, University Microfilms Order No. 72-15, 504 85p.; 1971

BUTACHLOR; HERBICIDES; DEGRADATION; SOILS; GREENHOUSE; BIOASSAY; BARNYARD GRASS; TEMPERATURE; PH; FLOODING; DEGRADATION; CARBON DIOXIDE; INHIBITION; METABOLITES; WATER; SOLUBILITY; SOLVENTS; GROWTH CHAMBER

The influence of specific edaphic environmental factors on the detoxication and subsequent degradation of n-butoxymethyl-2-chloro-2',6'-diethylacetanilide (Butachlor) was evaluated under greenhouse and growth chamber conditions. Detoxication of butachlor, as measured by bioassay with barnyard grass, was significantly enhanced by increasing temperatures to 32 degrees C, making the soil alkaline, flooding, introducing relatively high levels of organic matter, and by allowing exposure of more than four weeks. Total degradation of butachlor to CO_2 was enhanced also by high temperatures and length of exposure but was inhibited to a certain extent by flooding. Soil produced metabolites, of which three were soluble in certain organic solvents and five were water soluble, were also influenced by environmental factors, temperature and length of exposure being most significant. Flooding influenced the formation of certain metabolites soluble in organic solvent but did not influence the presence or amounts of water soluble metabolites.

67
Effect of the Herbicide Atrazine on the Microflora and its Detoxication in Calcareous Chernozem

Bakalivanov, D.; N. Pushkarov Inst. Soil Sci., Sofia, Bulg.

Kongr. Mikrobiol., Mater. Kongr. Mikrobiol. Bulg., 2nd(25DJA7), 4, 259-61; 1971

ATRAZINE; SOILS; MICROFLORA; SUPPRESSION; HERBICIDES

Concentrations of 3.5 mg atrazine /kg in calcareous chernozem soil suppressed the number of bacteria, actinomycetes, and molds added to the soil by 30, 20, and 50% respectively the effect lasted for 1-2 months.

68
Effect of Temperature and Ultraviolet Radiation on the Persistence of Methyl Parathion and DDT in Soils

Baker, R.D.; Applegate, H.G.; Tex. A & M Univ., College Station, TX

Agron. J. 62, 509-512; 1970

TEMPERATURE; ULTRAVIOLET RADIATION; METHYL PARATHION; PARATHION; DDT; SOILS; CLAY; LOAM; PESTICIDES; DDE; DDD; DBP; DDM

In controlled environmental conditions using Houston black clay, Pima silty clay and Pinal gravelly loam treated with a mixture of methyl parathion and DDT at 5, 20 or 1000 micrograms/g results indicated that temperature and ultraviolet radiation (300 to 400 mm) accelerated the loss of pesticides from the soils. Loss of DDT was more affected by temperature than loss of methyl parathion. Houston black clay soil at both temperatures (30 or 50 C) with or without irradiation, retained more DDT than the other 2 soil types. In soil extracts the only identifiable breakdown product of DDT was DDE (2,2bis(p-chlorophenyl)-1,1-dichloroethylene). From irradiated standard samples the DDT breakdown products included DDE, DDD (2,2 bis (p-chlorophenyl)-1,1-dichloroethane), DBP (4,4'-dichlorobenzophenone) and DDM (1-chloro-2,2-bis (pchlorophenyl) ethylene). A tentatively identified breakdown product of methyl parathion was its oxon derivative.

69
Effect of Biocides on Microbiological and Chemical Properties of Soil. 2. Effect of Simazine and Dithane M-45 On Nitrification in Soil

Balasubramanian, A.; Sidderamappa, R.; Oblisami, G.; Univ. Agric. Sci., Bangalore, India

Pesticides(PSTDAM), 7(3), 14; 1973

SOILS; NITRIFICATION; SIMAZINE; DITHANE; NITRITE; BIOCIDES; MANCOZEB

Soil treated with simazine or dithane M-45 (mancozeb) at the recommended application rates showed a general decrease in pH over a 60-day incubation period. No significant variation in the ammoniacal-n content was observed. Appreciable accumulation of nitritenitrogen occurred after 40 days of incubation with dithane M-45. more nitrate-n was recovered from simazine-treated soils than from dithane M-45 treated soils. Simazine at the normal application rate increased the rate of nitrification in soil while dithane M-45, especially at 10 times the normal rate, inhibited nitrification, resulting in accumulation of considerable nitritenitrogen which could inhibit plant growth.

70
Role of Humic Carrier Substances in DDT Movement Through Forest Soil

Ballard, T.M.

Soil Sci Soc Amer Proc, 35(1), 145-147; 1971

LYSIMETRY; INSECTICIDES; HUMUS; DDT; TRANSPORT; SOILS; FORESTS; MOVEMENTS

71
Phenolic Compounds in Heather Soils

Ballester, A.; Arines, J.; Vieitez, E.

An Edafol Agrobiol., 31(3-4), 359-366

GLUCOSIDE; HYDROXY BENZOIC-ACID; VANILLIC-ACID; CHROMATOGRAPHY; SPECTROSCOPY; SOILS; PHENOLIC

72
Environmental Contamination by Organochlorine Pesticides. 5. The Adsorption-Desorption of Lindane and Aldrin by Two Types of National Agricultural Soils

Baluja Marcos, G.; Serrano Gonzalvez, L., Jr.

Rev. Agroquim, Tecnol. Aliment., 10(4), 486-498; 1970

ADSORPTION; DESORPTION; LINDANE; ALDRIN; INSECTICIDES; CLAY; SOILS

The composition of two soil samples from the agricultural zones of Burjasot (Valencia) and Logrono, Spain, were determined in order to relate adsorption and desorption of lindane and aldrin to the components and physicochemical properties of the samples, mainly to their content of organic matter and clays. It was possible to deduce that binding forces of a distinct kind interfere in the adsorption, according to whether organic matter of clay predominated, in combination with the differing polarities of the insecticides. But no processes of ionic exchanged were observed. The practical conclusions are that the Burjasot soil is decontaminated more rapidly from lindane, due, probably, to its lower organic matter content. The Logrono soil retained a higher proportion of the insecticide. Aldrin was adsorbed more rapidly by the Burjasot sample with a higher content of clay, but it was retained completely by both soil samples. This adsorption-desportion equilibrium significantly influences dispersion of the insecticides in the environment and their contamination of fluvial currents. (22 references)

73
Chlorinated Pesticide Residues in the Soils of Arezzo Province

Banelli, G.; Lab. Chim. Prov. Arezzo, Arezzo, Italy

Boll. Lab. Chim. Prov.(BOLAAU) 1972, 23(4) 352-6; 1972

SOILS; CHLORINATED INSECTICIDES; INSECTICIDES; RESIDUES

74
Microbiological Detoxication of Herbicide in the Soil

Bankov, V.P.

Selskostop. Nauka(SENAAL) 1972, 11(1) 53-60; 1972

REVIEW; HERBICIDES; DETOXIFICATION; SOILS; MICROFLORA; MICROORGANISMS

The detoxification of herbicides in the soil by microflora is reviewed.

75
Trifluralin Behavior in Soils. 2. Volatilization as Influenced by Concentration, Time, Soil Moisture Content, and Placement

Bardsley, C.E.; Savage, K.E.; Walker, J.C.

Agron. J., 60, 89; 1968

VOLATILIZATION; SOILS; TRIFLURALIN

76
Studies on Aqueous Suspensions of Insecticides. 6. Further Notes on the Sorption of Insecticides by Soils

Barlow, F.; Hadaway, A.B.

Bull. Entomol. Research, 49, 315; 1958

AQUEOUS SUSPENSIONS; INSECTICIDES; SORPTION; SOILS

77
Behavior of Triphenyltin Acetate in Soil

Barnes, R.D.; Bull, A.T.; Poller, R.C.; Queen Elizabeth, College, London, England

Chemy Ind. No. 7, 204; 1971

TRIPHENYLTIN; TRIPHENYLTIN ACETATE; SOIL; CARBON 14; TPTA; DEGRADATION; LEACHING; NITROGEN; HALF-LIFE

Experiments with Carbon14-labelled tryphenyltin acetate (TPTA) indicated a half-life of approximately 140 days in soil. Degradation appeared to be by microbial activity. TPTA was not removed from a 25 cm column of soil after 6 weeks of continuous leaching and about 70% of the extractable fungicide remained sorbed in the top 4 cm of the soil. Neither rate nor total extent of nitrification were depressed by TPTA concentrations 5-10 higher than the usual agricultural doses.

78
Persistence of the Organotin Fungicide Fentin Acetate (Triphenyltin Acetate) in the Soil and on Surfaces Exposed to Light

Barnes, R.D.; Bull, A.T.; Poller, R.C.; Dep. Chem., Queen Elizabeth Coll., London, England

Pestic. Sci.(PSSCBG) 1973, 4(3) 305-17; 1973

FENTIN ACETATE; PERSISTENCE; SOILS; TRIPHENYLTIN; LEACHING; PHYTOPHTHORA; POTATO; FUNGICIDE; DEGRADATION; VOLATILIZATION; MODEL; PHOTODECOMPOSITION; TIN; DIPHENYLTIN; MONOPHENYLTIN; MAMMALS; PLANTS; LEACHING

The fungicide, fentin acetate (triphenyltin acetate) was biologically degraded by 25% in the soil in 140 days. Volatilization was negligible, and leaching did not occur. In studies with model systems, photodecomposition of fentin acetate to inorganic tin occurred via diphenyltin and monophenyltin compounds. Fentin acetate is effective for control of phytophthora infestans on potatoes; however, it is also toxic to plants and mammals.

79
Fate of Herbicide Derived Chloro Anilines in Soil

Bartha, R.

J Agr Food Chem 19 (2). 1971 385-387

FATE; CHLOROANILINES; HERBICIDES; SOILS

80
The Fate of Heptachlor in the Soil Following Granular Application to the Surface

Barthel, W.F.; Murphy, R.T.; Mitchell, W.G.; Caley, C.

J. Agr. Food Chem., 8, 445; 1960

FATE; HEPTACHLOR; GRANULAR APPLICATION; SOILS

81
Concentration of Picloram in the Soil Profile

Baur, J.R.; Baker, R.D.; Bovey, R.W.; Smith, J.D.

Weed Sci., 20(4), 305-309; 1972

HERBICIDES; PICLORAM; SOILS; RESIDUES; SPRAYS; POLYMERS

One month after the application of 1.12 kg/ha picloram, the residues recovered in the top 15 cm of soil were 93 ppb and in the 46 to 122 cm level, less than 5 ppb. 6 months after application 5 to 10 ppb were recovered in the 0 to 183 cm level and less than 5 ppb in the 198-224 cm level. Conventional picloram sprays resulted in significantly higher soil residues than polymerized sprays, although they were identical with respect to movement through the soil. Residues from polymer granules were greater than from polymerized sprays.

82
Scientific Research on Environmental Pollution by Pesticides Contribution to the Study of the Problem

Bazzi, B.

Contrib. Ist. Ric. Agrar. Milano., 11, 37-42; 1972

INSECTICIDES; SOILS; PESTICIDES

83
Endrin Transformations in Soil

Beall, M.; Harris, W.G.; Nash, R.G.

J. Environ. Qual., 1(4), 391-394; 1972

LAKELAND; SANDY LOAM; ENDRIN; SOYBEANS; RESIDUES; TRANSFORMATION; ENDRIN DELTA KETONE; ENDRIN ALCOHOL; ENDRIN ALDEHYDE; ENDRIN KETONE; SOILS; LOAM

A Lakeland sandy loam was treated at three depths with carbon-14-endrin insecticide in which one crop of soybeans (GLYCINE MAX L., MERR.) was grown. After the soybeans were harvested, the soil was sectioned and assayed for endrin residues. At least three and possibly five transformation products of endrin occurred. Two products were identified as endrin delta ketone and endrin alcohol. A third product may have been endrin aldehyde. Endrin transformation appeared to increase with soil depth. In an extremely acid soil (pH 4.2) endrin transformed to some endrin ketone and probably endrin aldehyde during treatment of the dry soil, but not of moist soil. Acid or base treatment of endrin and several endrin isomers indicated that endrin was stable under basic conditions and the endrin alcohol and endrin aldehyde (presumably) were stable in all treatments tested except the base treatment at 100C for endrin aldehyde. (18 references)

84
Crop Seedling Uptake of DDT, Dieldrin, Endrin, and Heptachlor from Soils

Beall, M.L.; Nash, R.G.

Agronomy J., 61, 571-575; 1969, July - August

UPTAKE; DDT; DIELDRIN; ENDRIN; HEPTACHLOR; SOILS; GREENHOUSE; SOYBEANS; WHEAT; CORN; ALFALFA; BROMEGRASS; CUCUMBERS; INSECTICIDES; PESTICIDES; ABSORPTION; RESIDUES

85
Water Degradable Polymers for Controlled Release of Herbicides and Other Agents

Beasley, M.L.; Collins, R.L.

Science (Washington), 169(3947), 769-770; 1970

WATER; HERBICIDES; DEGRADATION

86
The Significance of a Biologically Active Soil

Beckman, E.O.

Vitalst Zivilisationskr, 15(5), 181-184; 1970

MICROFLORA; AGRONOMY; USAGE; HERBICIDES; SOILS; ENZYME

87
Dissipation of Acetanilide Herbicides from Soils

Beestman, B.G.; Deming, J.M.

Agron. J., 66(2), 308-311; 1974

ALACHLOR; BUTACHLOR; PROPACHLOR; HALF-LIFE; VOLATILIZATION; MICROBIOLOGY; ACETANILIDE; LEACHING; PHOTODECOMPOSITION; DISSIPATION; HERBICIDES; SOILS

88
Isomerization of Gamma-BHC to Alpha-BHC in the Environment

Benezet, H.J.; Matsumura, F.; Dep. Entomol., Univ. Wisconsin, Madison, Wi

Nature (London)(NATUSA) 1973, 243(5408) 480-1; 1973

LINDANE; SOILS; MICROORGANISMS; ISOMERIZATION; BHC; ACCUMULATION; TRANSFORMATION; INCUBATION; NAD

Microorganisms (PSEUDOMONAS PUTIDA) in pure culture isomerized gamma-BHC to alpha-BHC. The P. PUTIDA normally produced gamma-pentachlorocyclohex-1-ene from gamma-bhc, but could produce alpha-bhc (3%) on incubation with NAD. Gamma-tetrachlorocyclohex-1-ene (19%) was also produced along with alpha-BHC. Alpha-BHC can be isolated from the environment in quantities larger than those expected on the basis of selective accumulation of impurities from the starting product alone. Soil microorganisms could be the cause of the transformation of gamma-bhc to alpha-bhc in the environment.

89
Residual Amounts of the Herbicide Picloram in Soil and Plants

Berezovskii, M.Y.; Kruezdorov, A.M.; USSR

Dokl. Tskha (Timiryazev. Sel'Skokhoz. Akad.)(DTSKAG) 1972, No. 180(Pt. 2) 151-6; 1972

PICLORAM; DICAMBA; SOILS; PLANTS; RESIDUES

90

Use of S-Triazine Derivatives as Herbicides on Peat Soils

Berezovskii, M.Y.; Nemova, G.N.; Moskow S.-KH. AKAD. IM. Timiryazeva, Moscow, USSR

Agrokhimiya(AGKYAU) (12) 102-10; 1973

TRIAZINE; HERBICIDES; PEAT; SOILS; ATRAZINE; PROMETRYNE; PROPAZINE; ABSORPTION; TRANSPORT

Herbicidal derivatives of s-triazine were much more strongly adsorbed by peat soils than by mineral soils, such as sod-podzolic soil. This high adsorptive capacity of peat soils toward triazine derivitives greatly decreased their herbicidal activities, their transport through the soil, and their availability to weeds, but their inactivation still proceeded with sufficient intensity. Thus, atrazine was adsorbed as much as 19-fold more strongly by peat as by sod-podzolic soils under various conditions, and prometryne was retained in the upper 5 CM of peat soil. Also, one is obliged to apply high doses of triazine herbicides and to preferentially apply them as postemergence treatments on peat soils. However, at 6 Kg/Ha, prometryn was inactivated within 2-3 months, but propazine was inactivated only in 1.5-2 years.

91

Microbiology of Soil

Berkeley, R.C.W.

Part of L. E. Hawker, A. H. Lincoln (Eds.), Micro-Organisms: Function, Form, and Environment. Edward Arnold, Ltd., 479-514; 1971

SOILS; CARBON; NITROGEN; SULFUR; PHOSPHORUS; INTERACTION; PESTICIDES

Includes sections on: the soil environment, the soil inhabitants, methods for studying soil organisms, transformations in the soil (C, N, S, P), interactions and relations of soil organisms, pesticides and micro-organisms.

92

Persistence of Termiticides in Hawaiian Soils

Bess, H.A.; Hylin, J.W.

J. Econ. Entomol., 63(2), 633-638; 1970

BIOASSAY; TERMITICIDE; SOILS; TERMITES; RESIDUES; DIELDRIN; ALDRIN; HEPTACHLOR; CHLORDANE; DDT; LINDANE; SODIUM ARSENITE; HEPTACHLOR EPOXIDE; DALDRIN; PERSISTENCE

Bioassay and residue analysis data on termiticide-treated soils revealed that after 7 years of exposure in the field there were wide differences among the soils treated with the termiticides both in toxicity, or the availability of the toxicants to the test termites and residues and the toxicities and residues were not closely related. On the basis of the seventh-year toxicity to test termites, soils treated with seven termiticides ranked in the following order: dieldrin greater than aldrin greater than heptachlor greater than chlordane greater than DDT greater than lindane greater than sodium arsenite. In relation to residues present, the order was DDT greater than chlordane greater than heptachlor and heptachlor epoxide greater than daldrin and converted dieldrin greater than dieldrin greater than lindane greater than sodium arsenite. A further ranking on the basis of percentage of termiticide remaining was DDT greater than dieldrin greater than heptachlor and heptachlor epoxide greater than lindane greater than of the eighth and ninth years and from the standpoint of toxicity, after 9 years dieldrin and aldrin were clearly superior to the other termiticides in the tests.

93

Competitive Adsorption of Diquat(2 plus), Paraquat(2 plus), and Ca(2 plus) on Organic Matter and Exchange Resins

Best, J.A.; Weber, J.B.; Weed, S.B.; North Carolina State University, Raleigh, NC

Soil Science 114(6) 444-450; 1972

ADSORPTION; DIQUAT; PARAQUAT; CALCIUM; RESINS; CALCIUM CHLORIDE; CATIONS; SOILS

Flexibility in organic matter exchange sites was suggested as the reason for the equal extent of adsorption of paraquat, diquat and Ca as CaCl2. Competitive adsorption revealed the relative affinity of various adsorbents for these cations. A histosol and its humic and humin fractions showed preference in the order: paraquat greater than or equal to diquat greater than Ca when adsorption occurred on strong acid sites, and Ca greater than paraquat greater than or equal to diquat when adsorption occurred with weaker acid groups. The IR-120 resin (strong acid) had an order of preference of: diquat greater than paraquat greater than Ca, while the IRC-50 resin (weak acid) preferred Ca greater than diquat greater than paraquat. Preferential adsorption was attributed to the relationship between surface charge density of the adsorbents and cation charge spacings as well as steric hindrance due to cation size.

94

Metabolism and Degradation of Vinyl Phosphate Insecticides

Beynon, K.I.; Hutson, D.H.; Wright, A.N.; Shell Res. Ltd., Sittingbourne/Kent, England

Residue Rev.(RREVAH) 1973, 47, 55-142; 1973

REVIEW; VINYL PHOSPHATE; INSECTICIDES; METABOLISM; DEGRADATION; CROTOXYPHOS; CHLORFENVINPHOS; TETRACHLORFENVINPHOS; MEVINPHOS; PHOSPHAMIDON; DICROTOPHOS; MONOCROTOPHOS; WATER; PLANTS; ANIMALS; VINYL PHOSPHATE INSECTICIDES; SOILS

95
Analysis of Crops and Soils for the Triazine Herbicide Cyanazine and some of its Degradation Products. 2. Results

Beynon, K.I.; Posio, P.; Elgar, K.E.; Woodstock Agric. Res. Cent., Shell Res. Ltd., Sittingbourne/Kent, England

Pestic. Sci.(PSSCBG) 1972, 3(4), 401-8; 1972

CYANAZINE; HERBICIDES; DEGRADATION; SOILS

Crops and soils from field trials in 1967-1970 in several countries were analized for residues of the triazine herbicide, Cyanazine (BLADEX) and its degradation products, 2-chloro-4-(1-CARBAMOYL-1-Methylethylamino)-6-ethylamino-1,3,5-triazine 2-chloro-4-(1-cyano-1-Methylethylamino)-6-amino-1,3,5-triazine, and 2-chloro-4-(1-carbonyl-1-methylethylamino)-6-amino-1,3,5-triazine. The time for the concentration of cyanazine in soils to decrease to 50% of the initial value was approximately 1.3 to 5 weeks; the rate of loss was not affected by sparse crop cover and there was some indication that the rate was greater under moist soil conditions. Residues up to 0.5 ppm of carbamoyl triazine and up to 0.08 ppm carbonyl triazine were detected in soils at 4 weeks from carbamoyl triazine application at 2 kg/ha. The residues of cyanazine and the degradation products declined rapidly and were 0.07 ppm at 16 weeks from treatment. Neither residues of cyanazine nor those of carbamoyl triazine, cyano triazine, or carbonyl triazine were detected in a wide range of crops harvested from soils treated with recommended amounts of cyanazine, and the limits of detectability were 0.01 to 0.04 ppm.

96
Comparison of the Breakdown of the Triazine Herbicides Cyanazine, Atrazine, and Simazine in Soils and in Maize

Beynon, K.I.; Stoydin, G.; Wright, A.N.; Woodstock Agric. Res. Cent., Shell Res. Ltd., Sittingbourne/Kent, England

Pestic. Biochem. Physiol.(PCBPBS) 1972, 2(2), 153-61; 1972

TRIAZINE; HERBICIDES; SOILS; DEGRADATION; ATRAZINE; SIMAZINE; CYANAZINE

Atrazine and Simazine degraded in soils at a slower rate than Cyanazine, with hydrolysis of the Cl to OH predominating. With cyanazine, nitro group hydrolysis occurred before Cl hydrolysis. Atrazine was degraded in maize sap more slowly than cyanazine, and only hydrolytic reactions were evident. Chlorotriazines and hydroxytriazines were present following cyanazine treatment of maize plants grown in soil. The chlorotriazines were probably taken up as such from the soil.

97
Fates of the Herbicides Chlorthiamid and Dichlobenil in Relation to Residues in Crops, Soils, and Animals

Beynon, K.I.; Wright, A.N.; Woodstock Agric. Res. Cent., Shell Res. Ltd., Sittingbourne/Kent, England

Residue Rev.(RREVAH) 1972, 43, 23-53; 1972

REVIEW; HERBICIDES; DICHLOBENIL; DEGRADATION; CHLORTHIAMID

98
Occurrence of DDT Residues and Metabolites in Soil

Bhuiya, Z.H.; Rothwell, D.F.

Pak. J. Sci. Res., 21 (3-4), 1969, 97-99

OCCURRENCE; DDT; RESIDUES; METABOLITES; SOILS

99
Adsorption of Picloram (4-Amino-3, 5, 6-trichloropicolinic Acid) on Panoche, Ephrata, and Palouse Soils. Thermodynamic Approach to the Adsorption Mechanism

Biggar, J.W.; Cheung, M.W.; Dept. Water Science Engineering, University of California, Davis, CA

Soil Sci. Soc. Amer., Proc. (SSSAA8), 37(6) 863-8; 1973

HERBICIDES; ADSORPTION; SOILS; THERMODYNAMICS; PICLORAM; FREUNDLICH EQUATION

The adsorption of picloram by panoche, ephrata, and palouse soils could be described by the freundlich equation: x/m = KCE1/N, where x/m = micrograms Herbicide adsorbed/G soil, Ce = equilibrium concentration in ppm, and K and 1/N are consistant. The standard free energy, entropy and enthalpy associated with the adsorption of these soils were determined. The thermodynamic parameters calculated from the adsorption measurements in these experiments were useful in elucidation of the mechanisms involved.

100
Sorption and Movement of Polluted Water in Soil. Appendices

Biggar, J.W.; Riggs, R.L.; Public Health Service, Washington, DC 29130

Monitoring Agency Rept. No. 18; Grant FWPCA-WP-0081-06; PB-217 254, 219; 1973

LINDANE; INSECTICIDES; ADSORPTION; DIELDRIN; KAOLINITE; DDT; CHLORINE; GROUNDWATER; SORPTION; SOILS

The report consists of several appendices, each of which is a study of the adsorptive behavior of various insecticides in solution on soils.

101
Degradation of Dieldrin to Carbon Dioxide by a Soil Fungus TRICHODERMA KONINGI

Bixby, M.W.; Boush, G.M.; Matsumura, F.; Wisconsin University, Madison, Wisconsin

Bulletin of Environmental Contamination and Toxicology, 6(6), 491-494; 1971

DIELDRIN; CARBON DIOXIDE; DECOMPOSITION; DEGRADATION; SOIL FUNGUS; SOILS

Tests with C14-labelled dieldrin showed that 3.1% of the radioactivity was associated with the CO2 evolved during decomposition.

102
Physicochemical Study of the Adsorption of Organic Pesticides by Clays

Bladel, R.V.

Ann Gembloux, 77 (3), 1971, 183-194

ADSORPTION; PESTICIDES; CLAY

103
Proceedings of the 162nd Meeting of the American Chemical Society Division of Pesticide Chemistry Symposium on Chlorodioxins Origin and Fate

Blair, E.H.

Part of Blair, E.H. (Ed.), Chlorodioxins-Origin and Fate, Advances in Chemistry Series, No. 120, Proceedings of the 162nd Meeting of the American Chemical Society, Washington, DC, Sept. 16-17, 1971, American Chemical Society, Washington, DC, (p. 1-135), 141; 1973

PESTICIDES; CHLORODIOXIN; FATE; ORIGIN

104
Effect of Herbicides on the Biological Activity of Soils

Bliev, Y.K.; Leningr. Inst. Lesn. Khoz., Leningrad, USSR

Pochvovedenie(PVDEAZ) 1973, (7) 61-8; 1973

DALAPON; DICHLOROPHENOXYACETAMIDE; SOILS; NITROGEN; FIXATION; HERBICIDES; NITROGEN; CELLULOSE; DEGRADATION; CATALYSIS; CHERNOZEM; SODDY-PODZOL; PODZOL; RESPIRATION; MINERALIZATION; RESIDUES; LEACHING; CELLULOSE DEGRADATION; AMYLASE; INVERTASE; ENZYME

A dalapon-2,4-dichlorophenoxyacetamide mixture in a 20+2 kg/ha dose decreased, and in a 60+6 kg/ha dose increased the intensity of soil respiration in chernozem and soddy-podzolic soil. The herbicide mixture initially inhibited and then stimulated mineralization of plant residues. Both the nitrogen fixing (for the first 10 days) and cellulose-degrading (in leached chernozem) activities in the soil were increased by treatment with the dalapon-2,4-dichlorophenoxyacetamide mixture. The herbicide mixture increased the catalase activity but did not affect the invertase or amylase activity of the soil.

105
Effect of Dalapon and the Amine Salt of 2,4-D on the Nutritive System of Various Soil Types

Bliev, Y.K.; Leningr. Nauch.-Issled. Inst. Lesn. Khoz., Leningrad, USSR

Agrokhimiya(AGKYAU), (1), 112-17; 1973

HERBICIDES; SOILS; DALAPON; DICHLOROPHENOXYACETATE; AMINE SALT; ACCUMULATION; IRRIGATION; 2,4-D; NITROGEN; HUMUS; MOBILITY; POTASSIUM; PHOSPHORUS

In a 2-year experiment, dalapon at 20 kg/ha plus the amine salt of 2,4-D at 2 kg/ha increased NO3 accumulation in three derno-podzolic soils and a leached chernozem whose moisture contents were maintained at 60% of the limiting filed capacity by monthly irrigation. Dalapon at 60 kg plus the amine salt of 2,4-D at kg initially decreased NO3 accumulation but eventually increased it. The herbicides did not have much effect on the humus and total nitrogen contents of the soils, increased the mobile-phosphorus content somewhat and did not affect the content of exchangeable potassium.

106
Decay Time of DDT

Bloom, S.G.; Menzel, D.B.; Battelle Memorial Institute, Columbus, Ohio,

Science, 172(3980), 213; 1971

DECAY; DDT; HALF-LIFE

107
Pesticides in the Environment. Bibliography of Secondary Effects, Residues, and Mechanisms of Action

Blumenbach, D.; Biol. Bundesanst. Land-Forstwirtsch., Berlin-Dahlem, Germany

Mitt. Biol. Bundesanst. Land- Forstwirt., Berlin-Dahlem(MBBLA9) 1971, 141, 146; 1971

REVIEW; PESTICIDES; RESIDUES; MECHANISM

A listing of refs. Published between 1965 and 1970.

108
Determination of Hexilur in Water, Soil, and Products of Plant Origin

Botrova, V.I.; Bernatskaya, L.S.; Vses. Nauchno-Issled. Inst. Gig. Toksikol. Pestits., Polim. Plast. Mass, Kiev, USSR

Khim. Sel. Khoz. (KSKZAN), 10(9), 698-99; 1973

HEXILURE; SOILS; WATER; HERBICIDES; ANALYSIS

109
Environmental Factors Influencing Trifluralin Diffusion in Mexico Silt Loam Soil

Bode, L.E.; Univ. Missouri, Columbia, Mo.

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-7015, Diss. Abstr. Int. B., 1973, 33(9), 4251; 1972

TRIFLURALIN; DIFFUSION; SOILS; HERBICIDES; SILT; SILT LOAM; LOAM

An understanding of herbicide movement in soil is necessary for developing placement specifications for herbicides. Diffusion of radiolabeled trifluralin through mexico silt loam soil was measured in diffusion cells under laboratory conditions. Preliminary studies indicated that trifluralin diffusion coefficients are independent of diffusion time and chemical concentration in the soil. Vapor diffusion contributed the major portion of total diffusion at bulk densities less than 1.2 g/cm cubed. The magnitudes of vapor and solution diffusion are similar at bulk densities between 1.2 and 1.4g/cm cubed. There is an exponential relationship between temperature and the diffusion coefficient in the temperature range from 4.4 to 49 C. Diffusion was low air-dry soil fcr all temperatures, passing through a maximum at 8-15% moisture. When the air-filled porosity was reduced below approximately 50%, diffusion declined rapidly. A predicition model emplcying 15 terms and which accurately described the response surface of trifluralin diffusion coefficients was developed. Diffusion coefficients of 3.8 x ie-11 to 2.8 x 1e-6 cm/2 sec were found.

110
Mechanism of Trifluralin Diffusicn in Silt Loam Soil

Bode, L.E.; Day, C.L.; Gebhardt, M.R.; Goering, C.E.; U.S. Delta States Agric. Res. Cert., Agric. Res. Serv., Stoneville, Mi

Weed Sci.(WEESA6) 1973, 21(5), 480-4; 1973

TRIFLURALIN; SOILS; DIFFUSION; DETERMINATION; DIFFUSION COEFFICIENT; FICK'S LAW; SILT; LOAM; SILT LOAM; BULK DENSITY; SOIUTION DIFFUSION; VAPOR DIFFUSION; POROUS

Fick's second law with a constant diffusion coefficient adequately described trifluralin diffusion through mexico silt loam soil in the laboratory, regardless of concentration or diffusing time. Solution diffusicn increased directly with bulk densities to 1.1 g/cm3 and then decreased, whereas vapor diffusion decreased 60% for every 10% decrease in air-filled porosity. Vapor diffusion contributed the major portion of total diffusion at bulk densities less than 1.2 g/cm3. for bulk densities between 1.2 and 1.4 g/cm3, the magnitudes of vapor and solution diffusion were similar.

111
Prediction of Trifluralin Diffusion Coefficients

Bode, I.E.; Day, C.L.; gebhardt, M.R.; Goering, C.E.; U.S. Delta States Agric. Res. Cent., Agric. Res. Serv., Stoneville, Mi

Weed Sci.(WEESA6) 1973, 21(5), 485-9; 1973

TRIFLURALIN; SOILS; DIFFUSION; DETERMINATION; TEMPERATURE; DIFFUSION COEFFICIENT; MOISTURE

At 4.4-49 degrees there was an exponential relaticn between temperature trifluralin diffusion coefficients in soil. Diffusion was low in air-dried soil for all temperatures, then increased to a maximum when the soil had 8-15% moisture, and then decreased as moisture content increased still further. Diffusion decreased when the air-filled soil void space was reduced below 40%. An equation was developed to predict trifluralin diffusion coefficients from a factorial experiment with 7 soil moisture contents, 5 soil temperatures, and 2 bulk densities. Diffusicn cceefficients ranged from 3.8e-11 cm squared/sec to 2.8e-6 cm squared/sec. With the equation it is possitle to predict trifluralin diffusion coefficients for any combination of measured soil parameters if they are in the range of the variables used in the experiments.

112
Biochemical Transformation of Pesticides by Soil Fungi

Bollag, J.M.; Dept. of Agronomy, Pennsylvania State University, University Park, PA

Crit. Rev. Microbiol., 2(1), 35-58; 1972

PESTICIDES; FUNGI; SOIIS; XENOBIOTIC; OXIDATION; HYDRCIYSIS; REDUCTION; SYNTHETIC PROCESS; ENZYME; IYSIS; FUNGAL CELLS; FUNGAL ENZYMES; BIOTRANSFORMATION; REVIEW

This review summarized known fungal detoxication reactions of pesticides to provide a general concept of the possible transformation reactions which can be expected from the interference of fungi with xenobiotic compounds. The various reactions were grouped as oxidation, hydrolysis, reduction, and synthetic processes. Fungi participate actively in the biotransformation of pesticides, but the resulting products in laboratory experiments often show only a slight change from the parent substance. It is important to be aware cf the possible environmental toxicity of metabolic products as cpposed to the original substance. Whereas pesticidal molecules seem little changed by fungal interference when observed under the minimal, artificial conditions of a synthetic growth medium, contrary results were obtained with a purified enzyme. In a natural envircnment, lysis of fungal cells occurs and fungal enzymes are released which may be responsible for the transformation of a pesticidal chemical.

113

Metabolism of Carbaryl by a Soil Fungus

Bollag, J.M.; Liu, S.Y.; Dep. Agron., Pennsylvania State Univ., University Park, Pa.

J. Agr. Food Chem.(JAFCAU) 1971, 19(3), 487-90; 1971

CARBARYL; METABOLISM; SOILS; FUNGUS; GLIOCLADIUM; INSECTICIDES

The fungus GLIOCLADIUM ROSEUM, isolated from soil, metabolized Carbaryl to 3 metabolites which were isolated by thin-layer chromatography and identified as 1-naphthyl n-hydroxymethylcarbamate, 4-hydroxy-1-naphthyl methylcarbamate, and 5-hydroxy-1-naphthyl methylcarbamate by UV, IR, and mass spectroscopy. This indicates that n-alkyl- and aromatic ring-hydroxylation of carbaryl are important detoxication reactions of G. ROSEUM. The decrease of radioactivity from the growth medium containing side-chain labeled carbaryl indicated also that a further degradation of the formed metabolites occurred, or that an additional pathway is involved in carbaryl metabolism.

114

Hydroxylations of Carbaryl by Soil Fungi

Bollag, J.M.; Liu, S.Y.; Pennsylvania State University, University Park, Pennsylvania 16802

Nature, 236(5343), 177-178; 1972

SOILS; FUNGI; CARBARYL; HYDROXYLATION; INSECTICIDES; DETOXIFICATION

The ability of some common soil fungi to hydroxylate carbaryl is described. Most of the investigated soil fungi could metabolize C14 labelled carbaryl to hydroxylated derivatives, the products varying both qualitatively and quantitatively with the various fungi.

115

Degradation of Sevin by Soil Microorganisms

Bollag, J.M.; Liu, S.Y.; Dep. Agron., Pennsylvania State Univ., University Park, Pa.

Soil Biol. Biochem.(SBIOAH) 1971, 3(4), 337-45; 1971

SEVIN; DEGRADATION; SOILS; MICROORGANISMS; INSECTICIDES; HYDROLYSIS

Three soil isolates accelerated the hydrolysis of Sevin to 1-naphthol. A fungus, identified as FUSARIUM SOLANI, altered 1-naphthol rapidly, whereas one strain of bacterium degraded the hydrolysis product gradually, and another strain accumulated it under certain conditions. Mixed cultures of the investigated microbes were more effective in transforming sevin than pure cultures.

116

Investigation Into the Stability of Anti-Microbial Compounds in the Soil Complex

Bomar, M.T.

Int. Biodeterior. Bull., 7(1), 25-33; 1971

DETERIORATION; CHLOROPHENOLS; FUNGICIDES; SOILS; MICROBIOLOGY

117

Appearance of 1-Hydroxychlordene in Soil, Crops, and Fish

Bonderman, D.P.; Slach, E.; Indiana University Medical Center, Indianapolis, Indiana 46202

Journal of Agricultural and Food Chemistry, 20(2), 328-331; 1972

HYDROXYCHLORDENE; SOILS; CROPS; FISH; HEPTACHLOR; HALF-LIFE; TRANSLOCATION; METABOLITES

A 4-year study in Iowa revealed the presence of a metabolite of heptachlor, 1-hydroxychlordene (1HC), in soil, various crops and fish. The concentration of 1-HC found in soils in conjunction with heptachlor is consistent with the short half-life reported by Bowman. Translocation with metabolism accounts for the appearance of 1-HC in crops.

118

The Breakdown of Dimethyl 2,3,5,6-Tetrachloroterephthalate (DCPA) in Soil and Its Effect on Certain Processes of Soil Micro-Organisms.

Bone, H.T.; University of Wisconsin, Madison, WI

Thesis, University of Wisconsin, University Microfilms Order No. 70-8269; 1970

BREAKDOWN; DIMETHYL; TETRACHLOROTEREPHTHALATE; DCPA; SOILS; FUNGI; BACTERIA; ACTINOMYCETES; RESPIRATION; NITRIFICATION; DEGRADATION

In DCPA-treated soils (4 and 12 lb/acre), total number of fungi decreased during one growing season but no differences from control plots were observed a year later. The number of bacteria and actinomycetes was not significantly affected. The effect of DCPA on selected soil bacteria, fungi and actinomycetes in pure cultures is reported. Respiration and nitrification were unaffected in soils treated with 500 microgram DCPA/g soil. DCPA disappeared slowly in autoclaved soils but rapidly in soils under conditions conducive to high microbial activity. There was a lag phase of about 2 weeks before DCPA degradation began in soil.

119
Fate, Metabolism, and Toxicity of 3-Isopropyl-1H-2,1,3-Benzothiadiazin-4(3H)-1,2,2-Dioxide in a Model Ecosystem

Booth, G.M.; Yu, C.C.; Hansen, D.J.; Illinois Nat. Hist. Surb., Urbana, Il

J. Environ. Qual.(JEVQAA), 2(3), 408-11; 1973

BENTAZON; METABOLISM; FOOD CHAINS; ACCUMULATION; ALGAE; FISH; SNAILS; MOSQUITOES; CLAMS; CRABS; FRESHWATER; AQUATIC ECOSYSTEMSS; WATER; FRESHWATER CRABS; WATER FLEAS; FLEAS; MODEL; MODEL ECOSYSTEM; DDT; GAMBUSIA FISH; AQUARIUM WATER; METABOLITES; FATE; PERSISTENCE; AQUATIC FOOD CHAIN

The herbicide bentazon (3-isopropyl-1h-2,1,3-benzothiadiazin-4(3H)-one 2,2-dioxide) did not accumulate to a significant extent in a 7-element food chain (algae, fish (ELODEA sp.), snails (PHYSA sp.), mosquitos (CULEX QUINQUIFASCIATUS), clams (CORBICULA MANILENSIS), fresh water crabs (UCA MINAX), and water fleas (DAPHNIA MAGNA)) in a model ecosystem, when compared with DDT. Bentazon (10 ppm) was not toxic to the crab, snail, or gambusia fish, and only slightly toxic to the water flea. The primary metabolite of bentazon isolated from the aquarium water was n-isopropylanthranilamide, whereas anthranilic acid was the primary metabolite isolated from the crab. Unmetabolized bentazon and a trace metabolite n-2-carboxyphenyl-n-isopropylsulfodiamide were also found in the water and crab. Thus, although bentazon may not be dangerous to aquatic food chains, it will persist in water as a micropollutant.

120
Biochemical Transformations of Herbicide-Derived Anilines in Soil

Bordeleau, L.M.; Rutgers State Univ., New Brunswick, N. J.

(DABSAG) 1971, 192; 1971

HERBICIDES; ANILINE; SOILS

121
Biochemical Transformations of Herbicide-Derived Anilines. Requirements of Molecular Configuration

Bordeleau, L.M.; Bartha, R.; Dep. Biochem. Microbiol., Rutgers State Univ., New Brunswick, N. J.

Can. J. Microbiol.(CJMIAZ) 1972, 18(12), 1873-82; 1972

HERBICIDES; ANILINE; TRANSFORMATION; FUNGUS; SOILS

122
Ecology of a Herbicide Transformation. Synergism of Two Soil Fungi

Bordeleau, L.M.; Bartha, R.; Dep. Biochem. Microbiol., Rutgers State Univ., New Brunswick, N. J.

Soil Biol. Biochem.(SBIOAH), 3(4), 281-4; 1971

PROPANIL; TRANSFORMATION; SOILS; FUNGI; SYNERGISM; HERBICIDES

In nutrient solution and in sterilized soil, the sequential transformation of N-(3,4-DICHLOROPHENYL)Propionamide (PROPANIL) to 3,3', 4,4'-tetrachloroazobenzene and other complex residues was brought about by the synergistic interaction of 2 common soil fungi, PENICILLIUM PISCARIUM and GEOTRICHUM CANDIDUM. The interaction benefited both organisms as the end products of the transformation sequence allowed higher growth yields than either the parent herbicide or its primary cleavage product. The synergism of the 2 fungi prevailed only in the herbicide-induced stress situation.

123
Biochemical Transformations of Herbicide-Derived Anilines. Purification and Characterization of Causative Enzymes

Bordeleau, L.M.; Bartha, R.; Dep. Biochem. Microbiol., Rutgers State Univ., New Brunswick, N. J.

Can. J. Microbiol.(CJMIAZ), 18(12), 1865-71; 1972

HERBICIDES; ANILINE; FUNGUS; METABOLISM; SOILS; PEROXIDASE; FILTRATION; ENZYME; TRANSFORMATION; GEL FILTRATION; DIALYSIS; SALT PRECIPITATION; PEASIDASE; PH; RESIDUES; OXIDASE

From a culture filtrate of the soil fungus GEOTRICHUM CANDIDUM two extracellular enzymes were separated that were active in transformation on aniline. Using a concentration, salt precipitation, dialysis, and gel filtration sequence, the two enzymes, a peosidase and an aniline oxidase, were purified 54- and 68-fold, respectively. The characteristics of the partially purified enzymes were compared and were found to be for peroxidase and for aniline oxidase, respectively, as follows: optimal pH equals 4.4-5.0 and 4.8-5.4, energy of activation (Qw=3.0 and 1.6 apparent Km (aniline) 3.1 x ie-4 and 4.4 x ie-m. Km (H2O2) for peroxidase was 2.4 x 1e-6, km(O2) for aniline oxidase was 9.1 x ie-4 M. In the natural soil environment, peroxidase seems to have a greater role in pesticide residue transcormation than aniline oxidase.

124
Peroxidatic Condensation of Chloro Anilines

Bordeleau, L.M.; Bartha,

Bacteriol. Proc., 71, 16; 1971

PEROXIDATIC; CONDENSATION; CHLOROANILINES; PESTICIDES; SOILS

125
Biochemical Transformations of Herbicide-Derived Anilines in Culture Medium and in Soil

Bordeleau, L.M.; Bartha, R.; Dep. Biochem. Microbiol., Rutgers State Univ., New Brunswick, N. J.

Can. J. Microbiol.(CJMIAZ) 1972, 18(12), 1857-64; 1972

PEROXIDASE; SOILS; MICROORGANISM; TETRACHLOROAZOBENZENE; DICHLOROANILINE; GEOTRICHUM; ANILINES; HERBICIDES; TRANSFORMATIONS; SOILS

A correlation was established between peroxidase activity of soil and its capacity to transform 3,4 dichloroaniline, a breakdown product of several herbicides, to 3,3,4,4 tetrachloroazobenzene. Supplementation of soil by carbon and nitrogen sources for microbial growth stimulated both activities, and pointed to the microbial origin of soil peroxidases. Several peroxidase produing bacteria, actinomycetes, and fungi were isolated from soil and were characterized, of psychiatrists, the basis of its rapid growth and highperoxidase activity, a geotrichum candidum strain was selected for further study. The culture filtrate of this organism exhibited both peroxidase and aniline oxidase activity. The highest per milligram dry weight activity of these enzymes was observed after cultivation on a mineral salts medium supplemented with soil extract and yeast extract.

126
Adsorption of Unionized Herbicide Molecules by Soil Organic Matter

Borger, R.; Institut de Recherches Chimiques, Tervuren, Belgium

Revue de l'Agriculture, 25(2), 201-208; 1972

ADSORPTION; HERBICES; SOILS; REVIEW

127
Adsorption of Lindane and Dieldrin Pesticides on Unconsolidated Aquifer Sands

Boucher, F.R.; Lee, F.G.; Water Chem. Program, Univ. Wisconsin, Madison, Wis.

Environ. Sci. Technol.(ESTHAG), 6(6), 538-43; 1972

PESTICIDES; ADSORPTION; AQUIFER; SAND; LINDANE; DIELDRIN; SOILS

The adsorption of Lindane and Dieldrin on natural aquifer sand from portage county, Wisconsin, was investigated in laboratory batch tests. From aqueas solutions containing 5-500 microG pesticide/l., the adsorption capacity of the sand was in the ng/g range. The pesticide uptake was not affected by temperature and pH. Naturally occuring organics present in two Wisconsin lake waters reduced the adsorption of dieldrin without affecting that of lindane. Nearly 70% of the absorbed lindane and 20% of the adsorbed dieldrin were leached in three successive washes of distilled water.

128
Pesticide Residue Data Information Retrieval System

Bourke, J.B.; Loftus, G.; Lisk, D.J.; Pestic. Residue Res. Lab., New York State Agric. Exp. Stn., Geneva, N. Y.

J. Agr. Food Chem.(JAFCAU), 20(6), 1275-8; 1972

PESTICIDES; INFORMATION RETRIEVAL SYSTEM; COMPUTER DATA HANDLING; RESIDUES

129
Ecological Aspects of Pesticide Microbial Relationships

Boush, G.M.; Batterton, J.C.

Part of Matsumura, F., Boush, G.M. and Misato, T. (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. Oiso, Japan, October, 1971; Academic Press: New York, NY; London, England, (p. 401-422) 637 p.; 1972

BACTERIA; FUNGI; SOILS; MICROORGANISMS

130
Pesticide Degradation by Marine Algae

Boush, G.M.; Matsumura, F.; Department of Entomology, University of Wisconsin, Madison, WI 40657

Annual Report No. 1, Feb. 1, 1972 - Jan. 31, 1973; AD-754 841; Proj. NR-306-061; Contract N00014-67-A-0128-0023; Monitoring Agency Rept No. 18, 8 p.; 1973, February

METABOLISM; PLANTS; GROWTH; MORPHOLOGY; DDT; MARINE BIOLOGY; PESTICIDES; DEGRADATION; ALGAE; TLC; CARBON 14; RADIOTRACERS; AUTORADIOGRAPHY

A routine procedure to effectively survey algae for potential degradative ability has been developed. The pesticidal compound is added to algae cultures in long, or active growth phase. After incubation for seven days the cultures are analyzed for metabolites. This procedure allows one to minimize the possibilities of pesticide inhibition to inlcude possibilities of pesticide inhibition of growth. Also, controls have been expanded pesticide to killed algae cultures as well as to cell-free media. This is done primarily to monitor the degree of degradation due to non-metabolic processes. All pesticides are C14-labeled and degradation products examined by comparative TLC and autoradiography. The results to date of this survey are summarized.

131
Dieldrin: Degradation by Soil Microorganisms

Boush, G.M.; Matsumura, F.

Science, 156, 959-961; 1967

DIELDRIN; DEGRADATION; SOILS; MICROORGANISMS

132

Metabolism of Insecticides by Microorganisms

Boush, G.M.; Matsumura, F.

Soil Biochem., 2, 320-336; 1971

INSECTICIDES; DEGRADATION; MICROORGANISMS; METABOLISM; DDT; DDE; TDE; SOILS; EPOXIDATION; CYCLODIENE; ORGANOPHOSPHATES; CARBAMATES; OXIDATION; HYDROLYSIS; PESTICIDES

Stable insecticides are most extensively altered by biological degradation systems, particularly microorganisms, in soil. A review of microbial metabolism of insecticides yields too little information on which to base a sound theory explaining such metabolism, but it is possible that their lipophilic properties allow penetration into the normally selective cell wall and that organisms surviving would be either tolerant to or able to degrade the foreign compound to a less toxic or more easily eliminated form. The most extensive studies on DDT metabolites have been involved with the production of DDE and TDE. Probably the best documented metabolic activity of soils has been the epoxidation of cyclodiene insecticides. Organophosphates and carbamates are readily degraded in soil by oxidation and hydrolysis; microorganisms contribute to this degradation. The ease with which insecticide-degrading microorganisms are found is frequently related to the overall stability of the pesticide. (63 references)

133

Persistence of 2,4,5-T ((2,4,5-Trichlorophenoxy)Acetic Acid) in Grasslands of Texas

Bovey, R.W.; Baur, J.R.; Plant Sci. Res. Div., Agric. Res. Serv., College Station, Tex.

Bull. Environ. Contam. Toxicol. (BECTA6), 8(4), 229-33; 1972

CHLOROPHENOXYACETATE; RESIDUES; GRASSLAND; SOILS; HERBICIDES; 2,4,5-T; ECOSYSTEMS; TERRESTRIAL ECOSYSTEMS

2,4,5-T is short-lived in Texas grassland ecosystems and does not produce residues that persist from 1 year to the next. Following spraying with 0.5 or 1 lb/acre, the residues on grass were 26,500-144,000 ppb immediately after treatment, 40-5,930 ppb at 6 weeks, and 0-51 ppb at 26 weeks after treatment. In the upper soil layer, the initial concentrations of 2,4,5-T were 943-5,390 ppb and decreased to 0-6 ppb at 12 weeks after treatment.

134

Occurrence of 2,4,5-T and Picloram in Surface Runoff Water in the Blacklands of Texas

Bovey, R.W.; Burnett, E.; Richardson, C.; Merkle, M.G.; Baur, J.R.; Knisel, W.G.

J. Environ. Quality, 3(1), 61; 1974

HERBICIDES; WATERSHEDS; RESIDUES; 2,4,5-T; PICLORAM; RUNOFF; WATER; TRIETHYLAMINE SALTS; PASTURES; SOILS; DEGRADATION; RAINFALL

This investigation was conducted to determine the concentration of 2,4,5-T ((2,4,5-trichlorophenoxy) acetic acid) and picloram (4-amino-3,5,6-trichloropicolinic acid) in surface runoff water that may move from herbicide sprayed pastures and rangeland to untreated areas as a result of each major rainfall following treatment. A 1:1 mixture of the triethylamine salts of 2,4,5-T plus picloram was sprayed 5 times at 1.12 kg/ha every 6 months on a native-grass pasture watershed. Soil, grasses and runoff water were analyzed periodically following herbicide treatment. Herbicide content in the Houston Black clay from May 1970 to May 1972 remained low (0 to 238 ppb). Herbicide content on grass was high (50 to 70 ppm) immediately after treatment, but degraded rapidly thereafter. Plant "washoff" was the main source of herbicide detected in runoff water. Concentration of herbicide was moderately high (400 to 800 ppb) if heavy rainfall occurred immediately after treatment, but low (less than 5 ppb) if major storms occurred 1 month or longer after treatment. No damage occurred to cotton (GOSSYPIUM HIRSUTUM L.) or sorghum (SORGHUM BICOLOR (L.) Moench) from either spray drift or subsequent runoff water in fields adjacent and below several herbicide-treated watersheds.

135

Residual Characteristics of Picloram in Grassland Ecosystems

Bovey, R.W.; Scifres, C.J.

Bulletin, Texas Agricultural Experimental Station B-1111, 24p.; 1971

PICLORAM; GRASSLAND; GRASSLAND ECOSYSTEMS; RANGELAND; SOILS; SANDY SOILS; SORPTION; HERBICIDES; DILUTION; PHOTODECOMPOSITION; TERRESTRIAL ECOSYSTEMS

In general when 0.5 lb/acre or less of picloram is applied to rangeland, especially on heavy textured soils, downward movement is much less than where higher rates are applied to highly permeable sandy soils. In fine sandy soils detectable residues rarely moved below the top foot of the profile following the application of 0.25 lb/acre. No extensive sorption of picloram by the soil colloid or rapid detoxification by micro-organisms is indicated. Dilution in the soil may be one of the most important practical means of dissipating this herbicide. It is also susceptible to photodecomposition. Picloram residues in the environment however do not appear to be harmful to mammals, fish, birds, or insects.

136
Trace Elements in Biochemistry

Bowen, H.J.M.; Department of Chemistry, The University, Reading, England

Academic Press, New York and London, 241 p.; 1966

SOILS; ELEMENTRAY CYCLES; TRACE ELEMENTS; BIOLOGICAL FRACTIONATION; ISOTOPES; NATURAL RADIOACTIVITY; AIR; WATER; PLANTS; ANIMALS; REVIEW; METALS; SOILS

A brief review of the origin of the elements and their occurrence in rocks, soils, the ocean and the atmosphere. The elementary composition of plants and animals is discussed, together with quantitative data on elementary cycles involving living organisms. The uptake and excretion of elements, their essentially and toxicity, and the occurrence of essential elements in enzymes and other moleucles of biochemical interest are discussed. Contains information on the nautral radioactivity of organisms, and on the contamination of the environment by both radioactive and non-radioactive elements. A summary of the data available for the occurrence and behavior of 90 elements in the biosphere is included.

137
Effect of Water Upon Malathion Adsorption onto Five Montmorillonite Systems

Bowman, B.T.; Adams, R.S.; Fenton, S.W.; Univ. Minn., St. Paul, MN

J. Agric. Ed. Chem., 18, 723-727; 1970

ADSORPTION; MALATHION; MONTMORILLONITE; SODIUM; CALCIUM; COPPER; IRON; ALUMINUM; ION; CLAY; INFRARED SPECTROSCOPY; X-RAY DIFFRACTION; HYDROGEN BONDING; CARBONYL OXYGEN ATOMS; HYDRATION; WATERSHEDS; CATIONS; ION-DIPOLE; DEGRADATION

The effects of Na+, Ca+2, Cu+2, Fe+3, Al+3 and moisture content upon the adsorptive behaviour and stability of malathion on montmorillonite clay were investigated by infrared spectroscopy and X-ray diffraction. At relative humidities greater than 40%, malathion penetrated the interlayer region of the montmorillonite and was adsorbed as a double layer, giving an expansion of 5.6 to 6.5 A. The adsorpt ion mechanism was through a hydrogen bonding interaction between the carbonyl oxygen atoms and the hydration watersheds of the saturating cations. In dehydrated systems, a direct ion-dipole interaction occurred between the carbonyl oxygen atoms and the saturating cations. The magnitude of both interactions increased with cationic valence. No degradation of adsorbed malathion was observed.

138
Behavior of Chlorinated Insecticides in a Broad Spectrum of Soil Types

Bowman, M.C.F.; Schechter, M.S.; Carter, R.I.

J. Agr. Food Chem., 13, 360; 1965

CHLORINATED INSECTICIDES; INSECTICIDES; SOILS

139
Long-Term Use of Herbicides. Measurement of Residues of Diuron and Simazine in an Orchard Soil

Bowmer, K.H.; Div. Irrig. Res., Csiro, Griffith, Aust.

Aust. J. Exp. Agr. Anim. Hust.(AAAHAN) 1972, 12(58), 535-9; 1972

SIMAZINE; ATRAZINE; GAS CHROMATOGRAPHY; TRIAZINE; HERBICIDES; DIURON; SOILS; BIOASSAY; ORCHARDS; PLANTS; LEACHING

Simazine and Atrazine residues in soil were determined by alkali flame detector gas chromatography using a column packed with cyclohexane dimethanol succinate on chromosorb w, and N as the carrier gas. The column temperature was 195.degrees. Interferences were removed by the modified method of KNUSLI, E., et al., (1964). A linear response was shown in the 10-460 microG/ml range. The sensitivity was 5 mg, and compared favorably with that shown by bioassay (HOLLEY, K AND ROBERTS H. A., 1963). Diuron was determined only by bioassay. Following repeated diuron and simazine treatments in orchards, the former was leached in the soil to a depth of 40 cm, whereas the latter was confined to the surface 15 cm.

140
Field Study of a Chlordane Residue Problem: Soil and Plant Relationships

Boyd, J.C.; Animal Science Dept., Montana State University

Bull. Env. Contam. Toxicol., 6, 177-182; 1971

CHLORDANE; LUCERNE; PLANTS; SOILS; MILK; MANURE; COWS

A year after chlordane at 1.5-2.0 lb/acre had been sprayed onto lucerne before the plants were 1.5 inches tall, the chlordane content of the trash was 3.75 ppm under a new stand after a single spraying and 2.08 ppm under an old stand after 4-5 sprayings. Corresponding figures for the top 0.25 inches of soil were 0.38 and 1.32 ppm and for the 0.25-2.0 inch layers 0.11 ppm. When milk plus manure from contaminated cows was applied as fertilizer, the chlordane content of the trash was increased from 0.09 to 0.44 ppm.

141
Degradation of Fluometuron in Sandy Loam Soil

Bozarth, G.A.; Funderburk, H.H.; Department of Botany and Plant Pathology, Auburn University, Auburn, Alabama

Weed Sci. 19(6), 691-695; 1971

HERBICIDES; FLUOMETURON; LOAM; DEGRADATION; DEMETHYLATION; SOILS; ANILINE; TRACER; CARBON 14; HYDROLYSIS

In laboratory experiments degradation of C^{14}-fluometuron (labelled in the trifluoromethyl group) in non-autoclaved soil was accelerated by addition of glucose plus yeast. Degradation was slight and non-biological in autoclaved soil. Degradation involved demethylation in two steps, probably followed by hydrolysis of the urea linkage to form the aniline derivative. A small but significant amount of 14CO2 was released from the soil.

142
DDT and Toxaphene Movement in Surface Water from Cotton-D Plots

Bradley, J.R.; Sheets, T.J.; Jackson, M.D.

J. Environ. Qual., 1 (1), 102-105; 1972

SOILS; RESIDUES; PONDS; WATER; DDT; TOXAPHENE; MOVEMENT; SURFACE WATER; COTTON

143
Persistence of Foliar-Applied 2,4,5-T in Woody Plants

Brady, H.A.; South. Forest Exp. Stn., Pineville, La.

Proc., S. Weed Sci. Soc.(SWSPBE), 26, 282-7; 1973

TRICHLOROPHENOXYACETATE; METABOLITES; TREES; SOILS; RESIDUES; 2,4,5-T; PLANTS; PERSISTENCE

144
Ground Contamination by Herbicides

Briski, A.; Cencelj, J.; Hocevar, J.; Macek, J.; Sisakovic, V.; Kmetijski Inst. Slov., Ljubljana, Yugoslavia

Agrohemija(AGHJA4), (1-2), 37-43; 1973

HERBICIDES; RESIDUES; SOILS; SIMAZINE; ATRAZINE; METABROMURON; PROMETRYNE; VINEYARDS; ORCHARDS; POTATOES; HUMUS

Data are given on residues of atrazine in the vineyard, simazin in the orchard, and prometryne and metabromuron in a potato field. The direct correlation existed between the amount of humus in the soil, and the atrazine and simazine residues. The highest amounts of prometryne and metabromuron were in the middle and upper soil layer, respectively.

145
Comparison of the Disappearance of Eight Organophosphorus Insecticides from Soil in Laboratory and in Outdoor Experiments

Bro-Rasmussen, F.; Noddegaard, E.; Voldum-Clausen, K.; Natn. Food Inst., Div. Food Additives, Pesticides, Contaminants, Gladsaxe, Denmark

Pestic. Sci. 1, 179-182; 1970

INSECTICIDES; SOILS; APHIDS; BROMOPHOS; MECARBAM; TRICHLORONATE; LOAM; METABOLITES; PERSISTENCE; ORGANOPHOSPHORUS INSECTICIDES

Comparison of disappearance curves in semilogarithmic coordinate systems for aphidan (O,O-diisopropyl-S-ethyl-sulphinyl methyl dithiophosphate), bromophos, chlorfenvinphos, dichlorfention. dimethoate, mecarbam and trichloronate in a loamy soil under laboratory conditions and outdoor experiments showed that a strict control of several parameters (for example, moisture content of the soil and temperature) is necessary for quantitative description of persistence rates. However, reasonably good agreement in the relative order of persistence was found and a tentative classification of the insecticdes according to degree of persistence is suggested. Metabolites from 2 of the insecticides were found in the soil, but their contribution to total residues and therefore to persistance were not included because of lack of definite identifications and final determinations.

146
Degradation of Organochlorine Insecticides. Problems and Possibilities

Brooks, G.T.; Agric. Res. Counc. Unit Invertebr. Chem. Physiol., Univ. Sussex, Brighton, England

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAAY) 1972, 6, 223-36; 1971

REVIEW; ORGANOCHLORINE INSECTICIDES; INSECTICIDES; METABOLISM; DDT; ENZYME; BIOTRANSFORMATION

A study of the chemical and biological transformations of organochlorine compounds is made extremely difficult due to the small amounts of available metabolic products.
Biotransformation products may be produced by in vivo experiments, use of tissue homogenates or partially purified enzyme systems, and use of chemical systems modeling enzyme reactions. The relevance of photochemical reactions to environmental changes in toxicant composition and the fact that photochemical reactions conducted in the presence of oxygen sometimes produce products similar to those formed by microsomal mixed function oxidase enzymes illustrate the usefulness of such reactions with organochlorine compounds. Due to the importance of anaerobic microbial biotransformations regarding the final disposal of orgachlorine compounds, reagents such as chromous chloride, which appear to mimic such processes, will be of increasing interest.

147
Pathways of Enzymic Degradation of Pesticides

Brooks, G.T.; Unit Invertebr. Chem. Physiol., Univ. Sussex, Brighton, England

Environ. Qual. Saf.(EQSFAP) 1972, 1, 106-64; 1972

REVIEW; ENZYMIC DEGRADATION; PESTICIDES; ENZYME

A review with 302 references. On the enzymic processes of pesticide degradation, on the nature and consequences of the biotransformations, and on the enzymic mechanisms of toxicity, resistance and synergism.

148

Metabolism, Degradation, and Volatilization of Endrin After Application to Soils

Brooks, T.M.; Memphis State Univ., Memphis, Tenn.

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-6517, Diss. Abstr. Int. B., 1973 33(9), 4160; 1973

ENDRIN; FATE; SOILS; METABOLISM; VOLATILIZATION; DEGRADATION

To determine the fate of endrin applied to soils thirty-seven compounds representing possible metabolic or degradation products of endrin were purchased or synthesized and their gas-chromatographic relative retention times (RRT) determined on three columns of different polarity. Field soil samples known to have been treated with endrin were collected, extracted, and analyzed; the RRT values obtained for the principal extracted components were compared with the values for the standards on the three columns. Thirteen of the standards matched with the RRTs of major components; 9 did not give GLC responses on the columns used; and 15 definitely were not among the major components of the soil extracts. During a study of volatilization of endrin and its metabolite, ERP1, from soils under controlled conditions, increases in temperature and percent moisture greatly increased volatilization. Increases in rate of air flow and addition of uv radiation only slightly increased endrin volatilization. ERP1 showed no detectable volatilization after 4 days. More endrin volatilized from the surface of a watch glass than from the surface of the soil, although the areas of the two surfaces were similar. Prolonged storage of endrin and related standards resulted in conversion of 5 compounds, but none of the conversion products matched with the RRT of a major soil extract component.

149

Interaction of Inorganic and Organic Fertilizer Materials with Pesticides as Related to Water Quality in Soils

Brown, D.A.

U.S. Gov. Res. Develop Rep., 70(6), 121, PB-188 913; 1970

NITRATES; AMMONIUM; CLAY; NITROGEN; FLUOMETURON; PROMETRYNE; ALDRIN; ADSORPTION; FERTILIZERS; PESTICIDES; WATER; SOILS

150

Biological Fate of Ddt in a Sub-Arctic Environment

Brown, N.J.; Brown, A.W.A.

J. Wildlife Manage., 34(4), 1970, 929-940

SOILS; PLANTS; ANIMALS; RESIDUES; DDE; FATE; DDT

151

DDT Residues in Soil in the Winnipeg Area

Brust, R.A.

Manit. Entomol., 5, 1971 (Recd 1973), 49-53

MOSQUITO CONTROL; VEGETATION; SOILS; DDT; RESIDUES

152

Performance and Persistence of Atrazine

Buchanan, G.A.; Hiltbold, A.E.; Agric. Exp. Stn., Auburn Univ., Auburn, Ala.

Weed Sci.(WEESA6) 1973, 21(5), 413-16; 1973

ATRAZINE; HERBICIDAL ACTION; TRIAZINE; HERBICIDES; DEGRADATION; PERSISTENCE; CORN; GRASS; WEEDS

The effects of rate, time, and method of application of atrazine on its performance when used for weed control in corn, and the persistence of atrazine and simazine are discussed. Grass and broadleaf weeds are effectively controlled by atrazine. Experiments proved atrazine to be short-lived in soils.

153

Researches Concerning the Residue and the Shifting of Herbicides in Soil

Budoi, G.

Lucr. Stiint. Inst. Cercet. Zooteh, 13, 123-128; 1970

OATS; CORN; ATRAZINE; DOSES; PHYTOTOXICITY; SOILS; IRRIGATION; HERBICIDES

154

Further Studies of the Fate of Aldicarb in Soil

Bull, D.L.; Stokes, R.A.; Coppedge, J.R.; Agric. Res. Serv., U.S. Dep. Agric., College Station, TX

J. Econ. Ent. 63, 1283-1289; 1970

ALDICARB; SOILS; SAND; LOAM; CLAY; PH; VOLATILIZATION; DECOMPOSITION; TRACER; FATE

C14-or S35-labelled aldicarb was added to sands, loams, clay, and an organic soil with pH's of 6, 7 or 8, and at moisture levels of 0, 50, or 100% of field capacity. Aldicarb and its toxic derivatives were relatively stable in all of the dry soils, in sand at all moisture levels and in loam with 50% moisture. There were no differences due to pH except in the dry sand sample of pH 6, where a rapid volatilization occurred. At the 100% moisture level, decomposition to non toxic products was rapid.

155
Transformation of Propanil Derived 3,4-Dichloroaniline in Soil to 3,3,4,4-TetraChloroazobenzene as Related to Soil Peroxidase Activity

Burge, W.D.; U.S. Dept. of Agriculture, Agricultural Research Service, Iaeq, Biological Waste Management Lab., Beltsville, Md 20705

Soil Sci Soc am Proc., 37(3), 1973, 392-395; 1973

FUNGI; BACTERIA; MICROORGANISMS; HERBICIDES; DECOMPOSITION; TRANSFORMATION; SONIFICATION; PROPANIL; 3,4-DICHLOROANILINE; SOILS; 3,3,4,4-TETRACHLOROAZOBENZENE; TCAB; DCA

Contrary to reports in the literature, no correlation was found between the peroxidase activity of five soils or the numbers of peroxidase-producing microorganisms and the abilities of the soils to condense 3,4-dichloroaniline (DCA) derived from the hydrolysis of n-(3,4-dichlorophenyl) propionamide (propanil) to 3,3',4,4'-tetrachloroazobenzene (TCAB). Amending the soils with an energy source increased the production of peroxidase extractable from the soil but decreased the amount of TCAb formed. It has been reported that a peroxidase-producing fungus isolated from soil was capable of converting dca to TCAb. However, peroxidase isolated directly from a soil of this study was incapable of converting dca to TCAb. Apparently not all soil peroxidases catalyze the conversion.

156
Anaerobic Decomposition of Ddt in Soil Acceleration by Volatile Components of Alfalfa-D

Burge, W.D.

J. Agr. Food Chem., 19(2), 1971, 375-378

CHLOROPHENYL; ETHANE; ETHYLENE; GLUCOSE; ISOBUTYRALDEHYDE; ETHANOL; METHANOL; SOILS; DECOMPOSITION; DDT

157
Microbial Populations Hydrolyzing Propanil and Accumulation of 3, 4-Dichloroaniline and 3,3',4,4'-tetrachloroaz benzene in Soils

Burge, W.D.; U.S. Department of Agriculture, Beltsville, MD

Soil Biology and Biochemistry 4(4), 379-386; 1972

PROPANIL; DICHLOROANILINE; SOILS; TETRACHLOROAZOBENZENE; DCA; TCAB; HYDROLYSIS; ACYLAMIDASE; DECOMPOSITION; MICROBES

Between 30 and 60% of the propanil applied to 5 soil types was hydrolyzed to DCA within 2 to 4 hours. The TCAB that accumulated was still present after 280 days of incubation. Propanil-hydrolyzing ARTHROBACTER and NOCARDIA spp. were present in large numbers. When finely divided propanil was applied to moist soils a portion was rapidly hydrolyzed by an acylamidase. The rate of decomposition and amounts of DCA and TCAB formed were unrelated to soil texture and organic matter.

158
Determination of Isopropyl-n-Phenyl Carbamate and N-3 Chlorophenyl Carbamate and Propanil and Some Metabolites of These Herbicides in Soil Incubation Studies

Burge, W.D.; Gross, L.E.

Soil Sci., 114(6), 1972 (Recd 1973), 440-443

3,4-DICHLOROANILINE; 3,3-DICHLOROAZOBENZENE; 3,3,4,4-TETRACHLOROAZOBENZENE; GAS LIQUID CHROMATOGRAPHY; COLORIMETRY; CARBAMATES; PROPANIL; BENZENE; SOILS; METABOLITES; HERBICIDES

159
Physicochemical Interactions of Paraquat with Soil Organic Materials and Model Compounds. 1. Effects of Temperature, Time and Adsorbate Degradation on Paraquat Adsorption

Burn, I.G.; Hayes, M.H.; Stacey, M.; Dep. Chem., Univ. Birmingham, Birmingham, England

Weed Res.(WEREAT) 1973, 13(1), 67-78; 1973

PARAQUAT; ADSORPTION; SOILS; MODEL; ZEO-KARB; AMBERLITE; POLYMERS; BENZOQUINONE POLYMERS; HUMUS; EQUILIBRIUM; ION EXCHANGE; CROSS LINKAGE; DECOMPOSITION; DIFFUSION; DEGRADATION; RATE

The adsorption of paraquat to zeo-karb 216, zeo-karb 226, amberlite xad-2, benzoquinone polymers, an organic soil, and humic soil fractions was studied in relation to time and temperature. Adsorption equilibrium ranged from 3 hours for the soil and humic preparations to 48 hours for the more highly crosslinked materials. The adsorption equilibrium was not affected by temperature (20-70 degrees), indicating that ion exchange is the primary adsorption mechanism. There was no evidence of paraquat decomposition in any of the adsorption systems tested. The rate of paraquat adsorption to soil organic matter or model compounds apparently is controlled by the diffusion rate within the adsorbent matrix.

160
Physicochemical Interactions of Paraquat with Soil Organic Materials and Model Compounds. 2. Adsorption and Desorption Equilibria in Aqueous Suspensions

Burns, I.G.; Hayes, M.H.; Stacey, M.; Dep. Chem., Univ. Birmingham, Birmingham, England

Weed Res.(WEREAT) 1973, 13(1), 75-90; 1973

PARAQUAT; ADSORPTION; SOILS; DESORPTION; EQUILIBRIUM; ZEC-KARB; AMBERLITE; POLYMERS; BENZOQUINONE POLYMERS; HUMUS; ION; ION EXCHANGE; HYDROCHLORIC ACID; SORPTION; MODEL

The adsorption and desorption equilibriums of paraquat were studied with zeo-karb 216, zec-karb 226, amberlite xad-2, benzoquinone polymers, an organic soil, and humic soil fractions. Measurement of the counter ion in solution at equilibrium and correlation of the adsorption with exchange capacity for hydrogen ion adsorbents showed that ion exchange was the primary adsorption mechanism. Desorption of paraquat with HCl from organic soil preperations was less than expected. The amount of paraquat adsorbed was directly dependent on the selectivity and on the exchange capacity of the adsorbent, but steric effects could also affect the results. Desorption should behave as the reverse of adsorption, when ion exchange is the only mechanism taking part in the sorption process.

161
Studies of the Adsorption of Paraquat on Soluble Humic Fractions by Gel Filtration and Ultrafiltration Techniques

Burns, I.G.; Hayes, M.H.; Stacey, M.; Dep. Chem., Univ. Birmingham, Birmingham, England

Pestic. Sci.(PSSCBG) 1973, 4(5), 629-41; 1973

PARAQUAT; ADSORPTION; SOILS; HUMUS; SEQUENCE; CATIONS; FENLAND SOIL; SODIUM; CALCIUM; ULTRAFILTRATION; FILTRATION; GEL FILTRATION

Paraquat dichloride (DICHLORIDE) was more tightly adsorbed by sodium ion humate (from a fenland soil) than by calcium ion humate. Apparently the soluble humate fraction has a selectivity sequence for exchangeable cations. Comparable results were obtained on columns of sephadex g10 and from ultrafiltration through an amicon diaflo um-2 ultrafilter. Dichloride was adsorbed to the same extent on each of 4 fractions of sodium ion humate seperated on sephadex g10C.

162
Spectroscopic Studies on the Mechanisms of Adsorption of Paraquat by Humic-Acid and Model Compounds

Burns, I.G.; Hayes, M.H.; Stacey, M.; Chemistry Department, Birmingham University, Edgbaston, Birmingham B15 2Tt, England

Pestic. Sci., 4(2), 1973, 201-209; 1973

CARBOXYLIC ION EXCHANGE; RESINS; HYDRO QUINONE; POLYMERS; ION EXCHANGE; ORGANIC MATTER; SOILS; PARAQUAT; ADSORPTION; HUMIC ACID; BEERS LAW

Changes in the relative sizes of the carboxylic absorption bands in the infrared spectra (near 1730 and 1610 cm-1) of adsorbents before and after treatment with paraquat showed that ion exchange was the predominant mechanism fo adsorption of the bipyridyl by H+ion saturated preparations of a humic acid from an organic soil, by two hydroquinone polymers and by two carboxylic ion-exchange resins. Attempts to relate the extents of saturation (with adsorbate) of the exchange sites with the optical densities of the infrared bands were unsuccessful because of deviations from Beer's Law. Ultraviolet spectroscopy failed to provide evidence for charge transfer mechanisms in paraquat-humic acid complexes in aqueous systems.

163
The Loss of Phosdrin and Phorate Insecticides from a Range of Soil Types

Burns, R.G.; Department of Soils and Plant Nutrition, California University, Berkeley

Bulletin of Environmental Contamination and Toxicology, 6(4), 316-321; 1971

PHOSDRIN; PHORATE; INSECTICIDES; SOILS; MUCK; CLAY; PEAT; SAND; PERSISTENCE

Sterilized and unsterilized soils were incubated with the insecticides for various times up to 144 hours. Complete loss of Phosdrin had occurred from muck, clay and peat after two days, but after about 6 hours the loss from sand and peat/sand became much slower. Rates of loss from unsterilized soils were up to twice as great as from sterilized soils. Loss of phorate was slower, with retention after 48 days from 82 to 24% in the order; muck greater than peat, peat greater than peat/sand; peat/sand greater than sand, sand greater than clay.

164
Soil Persistence of Repeated Annual Applications of Atrazine

Burnside, O.C.; Fenster, C.R.; Wicks, G.A.; University of Nebraska, Lincoln, Nebraska

Weed Sci., 19(3), 1971, 290-293; 1971

ZEA-MAYS-M; FALLOW PLOTS; HERBICIDE; DISSIPATION; SPRINKLER IRRIGATION; PERSISTENCE; SOIL; ATRAZINE

Dissipation of atrazine in sprinkler-irrigated fields was faster in a silty clay loam of eastern nebraska than loams in central and western nebraska. Atrazine dissipated faster under fallow than maize culture in the west but there was no difference in the center or east. In central and western nebraska atrazine persisted in the soil for greater than 1 year but in the east most was dissipated before the next growing season. Sprinkler irrigation markedly reduced atrazine longevity.

165
Dissipation of Dicamba Picloram and 2,3,6-Trichloro Benzoic-Acid Across Nebraska

Burnside, O.C.; Wicks, G.A.; Fenster, C.R.

Weed Sci., 19 (4), 1971, 323-325

SOILS; PERSISTENCE; PHYTOTOXICITY; DISSIPATION; DICAMBA; PICLORAM; 2,3,6-TRICHLORO BENZOIC-ACID

166
A Greenhouse Study of Variance of Picloram Retention in Soil and Duff from Juniper Sites

Burrough, L.N.; Fisser, H.G.

J. Colo-Wyo. Acad. Sci., 7(2-3), 103; 1972

HERBICIDES; SOILS; PICLORAM; RETENTION; DUFF

167
Microbial Degradation of Piperonylic-Acid by Pseudomonas-Fluorescens

Buswell, J.A.; Cain, R.B.

Febs. (Fed Eur Biochem Soc) Lett., 29(3), 297-300; 1973

DEGRADATION; INSECTICIDES; SYNERGISM

168
An Investigation of Lateral Surface Movement of Picloram

Byrd, B.C.; Williams, C.S.; Bjerke, E.I.

Proc Northeast Weed Control Conf. 25, 398; 1971

HERBICIDES; SOILS; WATER; PICLORAM; MOVEMENT; LATERAL MOVEMENT

169
Microbial Metabolism of the Pyridine Ring Bacterial Degradation of 1, Methyl-4-Carboxy Pyridinium Chloride a Photolytic Product of Paraquat

Cain, R.B.; Wright, K.A.; Houghton, G.; Newcastle University, England

Meded. Fac. Landouwwet. Rijksuniv. Gent., 35(2), 1970, 785-798; 1970

ACHROMOBACTER; MACH; GARDEN; SOILS; HERBICIDES; MICROBES; METABOLISM; DEGRADATION; PARAQUAT

A bacterium, ACHROMOBACTER D, isolated from garden soil, utilized 1-methyl-4-carboxypyridinium chloride as sole C source.

170
The Fate of Paraquat in Soils

Calderbank, A.; Tomlinson, T.E.; Jealott's Hill Res. Stn, Bracknell, England

PANS 15, 466-472; 1969

PARAQUAT; SOILS; ADSORPTION; HERBICIDES; VOLATILIZATION; LEACHING; DEGRADATION

Initial inactivation (primarily due to adsorption of the active ion by the soil) and ultimate fate of the herbicide in soil are reviewed. Losses by volatilization, leaching and chemical degradation are negligible; displacement of paraquat from the top soil is due to the mechanical movement of soil particles through the profile caused by weathering and by faunal activity; photochemical as well as microbiological processes may play an important role in the degradation (loss) of the herbicide.

171
Influence of Organic Matter Content of Soils on Insecticidal Control of the Wireworm Melanotus-Communis

Campbell, W.V.; Mount, D.A.; Heming, B.S.

J. Econ. Entomol., 64(1), 1971, 41-44

CORN; ALDRIN; DIAZINON; PARATHION; PHORATE; CARBOFURAN; CARBARYL; ALDICARB; SUPRACIDE; DYFONATE; BLADEN; SILT; LOAM; LOAMY; FINE SAND; SAND; SOILS; INSECTICIDES; WORMS; WIREWORM

172
Antimicrobial Agents. 7. Microbial Degradation of the Antifungal Agent 2-Chloro-4-Nitrophenol Nitrofungin

Capek, A.; Simek, A.; Leiner, J.; Weichet, J.

Folia Microbiol., 15(5), 350-353; 1970

DEGRADATION; DINITROPHENOL; FUNGICIDES; 2-CHLORO-4-NITROPHENOL

173
Pesticides in Soil - Organochlorine Pesticide Residues in Soils and Crops of the Corn Belt Region. United States - 1970

Carey, A.E.; Wiersma, G.B.; Tai, H.; Mitchell, W.G.; Technical Services Division, Office of Pesticide Programs, Environmental Protection Agency

Pesticides Monitoring Journal, 6(4), 369-76; 1973, March

PESTICIDES; CHLORINATED HYDROCARBONS; RESIDUES; HERBICIDES; INSECTICIDES; FUNGICIDES; ATRAZINE; CAPTAN; MALATHION; PROPACHLOR; AMIBEN; ALDRIN; ARSENIC; DIELDRIN; CORN; SOYBEANS; SORGHUM; HAY; SOILS; CROPS; GAS CHROMATOGRAPHY; CHROMATOGRAPHY; ATOMIC ABSORPTION SPECTROPHOTOMETRY; DETECTION LIMIT; POLYCHLORINATED BIPHENYLS; CHLORDANE; TOXAPHENE; ENDRIN; ISODRIN; PERSISTENCE; ORGANOPHOSPHATES; TRANSLOCATION; ORGANOCHLORINE PESTICIDES

In order to determine the levels of organochlorine pesticides in the Corn Belt region of the United States, a study was initiated in 1970 to sample 400 sites in 12 States. The sampling areas followed the historical boundaries of the Corn Belt and were selected from sites designated for the National Soils Monitoring Program. At each site a 2-qt soil sample (composite of 50, 2-by 3-inch cores, taken in a grid pattern over each 10-acre site) was collected as well as a composite sample of any available standing crop. In addition, use records were obtained at each site for the kinds and amounts of pesticides used during the 1970 cropping season as well as the names of other pesticides known to have been used in the previous 5 years. These data indicated that pesticides had been applied to most of the agricultural acreages in the study area (up to 85%). Forty compounds were identified in use records: 20 herbicides, 17 insecticides, and 3 fungicides. Atrazine was most widely used, followed by captan, malathion, 2,4-D, propachlor (Ramrod), amiben, and aldrin. Forty-five percent of the soil samples analyzed contained residues; 11 pesticides or metabolites were detected. Arsenic, which can occur naturally in soil, was detected in nearly all soil samples. The most commonly detected residues were those of aldrin, chlordane, and dieldrin. Seven compounds, including four DDT metabolites, were detected in cornstalks, soybeans, sorghum grain, sorghum fodder, and hay.

174
Dissipation of Soil-Incorporated Carbofuran in the Field

Caro, J.H.; Freeman, H.P.; Glotfelty, D.E.; Turner, B.C.; Edwards, W.M.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md.

J. Agr. Food Chem.(JAFCAU), 21(6), 1010-15; 1973

CARBONFURAN; INSECTICIDES; SOILS; DISSIPATION; METABOLISM; MAIZE; RUNOFF; WATERSHEDS; WATER; CROPS; KINETICS; HALF-LIFE; FATE; PH; APPLICATION; ACCUMULATION; LEAVES

In a 2-year investigation, carbofuran dissipation was measured by periodic sampling of soil, runoff, and maize (ZEA MAYS) crops in 2 small watersheds to which granular carbofuran had been applied, either broadcast or in the soil furrow. Carbofuron dissappeared from soil by apparent first-order kinetics, the half-life ranging from 46 to 117 days, with 5-10% converted to 3-ketocarbofuran, which disappeared at about the same rate as the parent. Carbofuran persistence was increased with in-furrow application, more acid soil, and low soil temperature from 0.5 to 2.0% of the carbofuron applied was lost in runoff, mostly in water rather than in sediments and less pesticide was lost in a given volume of runoff from an in-furrow application than from a broadcast application. The maize accumulated 0.14% of the applied pesticide by late summer, mostly in the leaves, but residues had decreased sharply by harvest. Most of the pesticide in the leaves had metabolized to 3-hydroxycarbofuran.

175
Pathways of Loss of Dieldrin from Soils Under Field Conditions

Caro, J.H.; Taylor, A.W.

J. Agr. Food Chem., 19(2), 379-384; 1971

MAIZE-M; INSECTICIDES; RUNOFF; WATER; VOLATILIZATION; SEDIMENTS; TRANSPORT; SOILS; CROPS; PLANTS

176
Measurement of Pesticide Concentrations in the Air Overlying a Treated Field

Caro, J.H.; Taylor, A.W.; Lemon, E.R.

Part of Westley, B. (Ed.). Identification and Measurement of Environmental Pollutants. Symposium. Ottawa, Ontario, Canada, June 14-17, 1971. National Research Council: Canada, (p. 72-77), 451 p.; 1971

PESTICIDES; AIR; DIELDRIN; VAPORIZATION; SOILS; LOSS

177
Effects of Soil Applied Herbicides and Calcium on Mineral Composition of Pea-D Pisum-Sativum-D

Carolus, R.L.; Putnam, A.R.; Ruiz, M.R.

Hortscience, 6(3 Sec. 2), 278

SIMAZINE; DINOSEB; DICHLOBENIL; TRIFLURALIN; NITROGEN; POTASSIUM; MAGNESIUM; SODIUM; IRON; MANGANESE; COPPER; ZINC; MEMBRANE; PERMEABILITY; ENZYME; ACTIVE TRANSPORT

178
Soil Factors Influencing Arsenic Soil Tests and Growth of Selected Turfgrasses

Carrow, R.N.; Michigan State Univ., East Lansing, Mich.

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-12,689, Diss. Abstr. Int. B., 1973, 33(11), 5095; 1972

ARSENIC; DETERMINATION; SOILS; POA CONTROL; ARSENICAL PHOSPHORUS HERBICIDE; HERBICIDES; TURFGRASS; GRASS; SOILS

179

Soil Moisture and Soil Type Influence Initial Penetration by Organochlorine Insecticides

Carter, F.L.; Stringer, C.A.; Forest Experiment Station, Forest Service, U.S. Dept. of Agriculture, Gulfport, MS

Bull. Envl. Contam. Toxicol., 5, 422-428; 1970

HEPTACHLOR; ALDRIN; CHLORDANE; DIELDRIN; INSECTICIDES; SOILS; ORGANOCHLORINES INSECTICIDES; SOIL MOISTURE; SILT; SANDY SOILS; CLAY

In laboratory experiments in which an emulsified mixture of heptachlor, aldrin, gamma-chlordane and dieldrin was applied to the top of soil columns, penetration by the 4 insecticides into an individual column was essentially the same for each insecticide. Penetration to the 5th and 6th layers of soil occurred in the sandy soils of Florida, Oregon and South Carolina. In the soils of Hawaii, Maryland, Missouri and Arizona (all of which had a higher content of silt and clay) over 70% of the insecticide was in the upper layer regardless of soil-moisture content. Penetration and distribution of insecticides were affected by soil-moisture content.

180

Soil Persistence of Termite Insecticides

Carter, F.L.; Stringer, C.A.; Wood Products Insect Laboratory Southern Forest Experiment Station, Forest Service, United States Department of Agriculture, Gulfport, MS

Pest Control, 39(2), 13-22; 1971

SOILS; ALDRIN; DIELDRIN; HEPTACHLOR; PERSISTENCE; CHLORDANE; INSECTICIDES; EPOXIDE; DEGRADATION; TERMITES

Soil samples from Arizone, Florida, Hawaii, Maryland, Missouri, Oregon and South Carolina were treated with water emulsions of 0.5% aldrin, dieldrin, an heptachlor or 1.0% chlordane at a rate of 1 ml of emulsion/10 g of soil. The residue levels were tested after 1.5, 3,6,9 and 12 months of weathering. More insecticide was lost from the surface layer of soil than from the lower soil layers. Aldrin and helptachlor broke down into their epoxides. All the samples exposed to 3 months weathering contained a second degradation product 1-hydroxychlordene.

181

1-Hydroxy-2,3-Epoxychlordene in Oregon Soil Previously Treated with Technical Heptachlor

Carter, F.L.; Stringer, C.A.; Heinezlman, D.; Southern Forest Experiment Station, Forest Service, USDA, Gulfport, MS

Bull Env. Contam. Toxicol., 6, 249-254; 1971

SOILS; HEPTACHLOR; DEGRADATION; GAS CHROMATOGRAPHY

A degradation product of heptachlor of unknown composition was revealed by gas chromatography.

182

Effect of Deposit Pattern Type on the Persistence of an Insecticide as Affected by Formulation, Rainfall, Aging, and Weathering

Carter, M.T.; Cornell Univ., Ithaca, N. Y.

(DABSAQ) 1972, 48: 1972

DIELDRIN; PERSISTENCE; KIDNEY BEAN; RAINFALL; WATER; DISTRIBUTION; INSECTICIDES; WEATHERING; HALF-LIFE

A disser.

183

Seasonal Abundance of Certain Soil Arthropods in a Fenitrothion-Treated Red Spruce Stand

Carter, N.E.; Brown, N.R.; Fac. For., Univ. N.B., Fredericton, N.B., Canada

Can. Entomol , 105(8), 1065-1073; 1973

FAUNA; RED SPRUCE; FENITROTHION; CENTIPEDE; SPIDERS; ARTHROPOD; SOIL FAUNA; INSECTS; SOILS

Certain arthropod predator elements of the soil fauna of a mature red spruce PICEA RUBENS SARG. stand were studied. It presents differences between abundance 2 year prior to and 1 year after aerial spraying with fenitrothion at 2 and 3 ounces per acre. One species of centipede ESCARYUS sp., species of pseudoscorpion MICROBISIUM sp. and 2 species of harvestmen LEIOBUNUM CALCAR and L. BICOLOR were noted in fewer numbers during the year of spraying. Higher numbers occurred the following year. Spiders of the family erigonidae showed no marked difference in numbers during the course of the study. Most other spiders were encountered in reduced numbers during the spray year but rebounded next year. Apparently, fenitrothion does cause temporary reduced abundance of at least some predacious arthropod components of the soil fauna. The effect of such changes in the insect community on soil processes remains unknown; even more so, the influence of repeated annual applications of fenitrothion remains undetermined.

184

Residues of Pentachloronitrobenzene and its Hexachlorobenzene Impurity in Soils and Lettuce

Casanova, M.; Dubroca, J.; Lab. Phytopharm., Inst. Natl. Rech. Agron., Versailles, France

C. R. Seances Acad. Agr. Fr.(CRHAA8) 58(12), 990-6; 1973

CHLOROPHENOLS; RESIDUES; SOILS; PLANTS; FUNGICIDES; LETTUCE; CHLOROBENZENE; PCNB; HCB; HEXACHLOROBENZENE; PENTACHLORONITROBENZENE

Commercial samples of pentachloronitrobenzene (PCNB) contained up to 6.2% hexachlorobenzene (HCB) as an impurity. Both PCNB and HCB were absorbed by lettuce from treated glasshouse soils. Residues of PCNB in lettuce ranged from 0.15 to 0.66 and 0.43 to 1.15 ppm for treatments of 15 and 30 kg/ha, respectively. Residues at harvest in treated soils varied from 5 to 21 ppm for treatments of 15 kg/ha. Residues from previous treatments in untreated soils ranged from 0.18 to 2.4 ppm for PCNB, and from 0.02 to 0.25 ppm for HCB.

185
Chemistry and Metabolism of Terminal Residues of Organophosphorus Compounds and Carbamates

Casida, J.E.; Div. Entomol., Univ. California, Berkeley, Calif.

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAAY) 6, 295-314; 1972

REVIEW; ORGANOPHOSPHORUS INSECTICIDES; METABOLITES; DYFONATE; CARBAMATE

186
Degradation of Organochlorine Insecticides in Flooded Soils in the Philippines

Castro, T.F.; Yoshida, T.; Dep. Soil Microbiol., Int. Rice Res. Inst., Los Banos, Philippines

J. Agr. Food Chem.(JAFCAU), 19(6), 1168-70; 1971

ORGANOCHLORINE INSECTICIDES; SOILS; DDT; DEGRADATION; DDD; METHOXYCHLOR; HEPTACHLOR; CHLORDANE; ALDRIN; DIELDRIN; FLOODING; WATER

DDT, DDD, Methoxychlor, and Heptachlor degraded faster in flooded soil than in upland soil. The degradation rate increased with the organic matter content. DDD accumulated in DDT-treated flooded soil. Aldrin was more persistent in flooded than in upland soil. Chlordan and Dieldrin were persistent in both flooded and in upland soil. The tests were carried out by adding the insecticide to soil samples in the lab. Flood and upland conditions were simulated.

187
Extraction and Study of Soil Enzymes Metabolizing Tryptophan

Chalvaignac, M.A.; Mayaudon, J.

Plant Soil, 34(1), 25-31; 1971

HUMIC ACID; RADIO CHROMATOGRAPHY; RADIO RESPIROMETRY; SOILS; METABOLISM; ENZYME; TRYPTOPHAN

188
Adsorption of DDT on Solid Particles

Champion, D.F.; Olsen, S.R.

Soil Sci. Soc. Am. Proc., 35(6), 887-891; 1971

SEDIMENTS; SOILS; INSECTICIDES; DDT; ADSORPTION; ION EXCHANGE; WATER

The adsorption of DDT from water by ion exchange resins, aluminium oxides, ion exchange celluloses and soils was determined by measuring 14C-labelled DDT remaining in solution. Positively charged adsorbents adsorbed more DDT from solution than negatively charged adsorbents. When soil-water systems were shaken for 2 days before the addition of DDT the amount of DDT adsorbed by the soil decreased, probably because of the association between DDT and organic matter and suspended clay particles in the aqueous phase.

189
Insecticide Adsorption of Lake Sediments as a Factor Controlling Insecticide Accumulation in lakes

Chesters, G.; Lee, G.P.; Dept. Soil Sci., Univ. Wisconsin, Madison, WI

1971, December; 1971, December

METHODOLOGY; PESTICIDES; ADSORPTION; LAKE SEDIMENTS; ORGANOCLAY; DEGRADATION; ORGANOCHLORINES; ORGANOPHOSPHORUS INSECTICIDES; BHC; MALATHION; PARATHION DEGRADATION; AMINOPARATHION; HYDROLYSIS; INSECTICIDES DIETHYLTHIOPHOSPHORIC ACID; P AMINOPHENOL; ISOMERIZATION; HYDROXY ATARZINE; S-TRIAZINE; AQUATIC ECOSYSTEMS; ATRAZINE

The investigation was divided into three phases: development of methodology for determination of pesticides in aquatic systems, determination of the extent of pesticide adsorption on intact lake sediments and on isolated mineral and organo clay fractions of lake sediments, and an evaluation of the rates and mechanisms of degradation of certain pesticides in the aquatic environment. Methods were developed for the unified determination of the eight organochlorine and five organophosphorus insecticides at the 0.06 to 1.0 microgram/liter level. Extent of adsorption of gamma, BHC, malathion, and parathion on sediments was determined. The most important factors governing adsorption were pesticide: sediment ratio, sediment concentration, pesticide concentration, and organic matter content. The rate and mechanism of degradatio of parathion was determined in intact lake sediments and simulated microbial systems; degradation was primarily microbial with the initial reduction of parathion to aminoparathion; further degradation was hydrolysis to diethylthiophosphoric acid and p aminophenol. Gamma BHC was detoxified in lake systems by microbial isomerization of the insecticide through alpha-, delta-, and beta-BHC; the reaction was much more rapid in anaerobic than aerobic systems. Hydroxy atrazine degrades in sediment systems and partial cleavage of the stable s triazine ring was indicated.

190
Degradation of Carboxin Vitavax in Water and Soil

Chin, W.T.; Stone, G.M.; Smith, A.E.

J. Agr. Food. Chem., 18(4), 731-732; 1970

FUNGICIDES; DEGRADATION; WATER; SOILS; CARBOXIN VITAVAX

191
Fate of Carboxin in Soil, Plants, and Animals

Chin, W.T.; Stone, G.M.; Smith, A.E.; Uniroyal Chem., Naugatuck, Conn.

Pestic. Terminal Residues, Invited Pap. Int. Symp.(25RHAY) 1971, 271-9; 1971

CARBOXIN; VITAVAX; DISTRIBUTION; METABOLITES; OXYCARBOXIN; PLANTVAK; PLANTS; FUNGICIDES

192
Metabolism of Propanil in Soils

Chisak, H.; Kearney, P.C.; U.S. Dep. Agric., Beltsville, MD

J. Agric. Fd. Chem., 18, 854-858; 1970

CARBON 14; METABOLISM; PROPANIL; SOILS; PADDY SOIL; CLAY; SAND; LOAM; TCAB; CARBONYL

The metabolism on unlabelled and C14-labelled propanil was studied on selected paddy soils: (A) light clay (pH 5.2), (B) coarses and (pH 5.3), (C) clay loam (pH 6.1), (D) clay loam (pH 6.3) and (E) light clay (pH 5.6). Propanil disappearance and 3,3',4,4'-tetrachloroazobenzene (TCAB) formation were influenced by soil type, at 85 and 850 ppm propanil levels the TCAB concentration after 15 days being in the order E greater than A greater than D greater than B greater than C, CO14(2) evolution from carbonyl-C14-propanil was rapid and varied between 60 and 80% of the original C14 applied, depending on soil type and concentration, and being greatest in soil (E). Ring 14CO(2) evolution was slow, amounting to less than 3% of the original C14. A major unknown compound was isolated from soil (E) receiving 850 ppm propanil and was related to TCAB by the addition of an-NH group to the azo compound.

193
Persistence and Effects of some Pesticides in Soil

Chisholm, D.; MacPhee, A.W.; Research Station, Canada Dept. of Agriculture, Kentville, Nova Scotia, Canada

J. Econ. Entomol., 65(4), 1010-1013; 1972

BEANS; FAUNA; DDT; BHC; ARSENIC; CHLORDANE; SULFUR; FERBAM; PARATHION; CROPS; NITROGEN; SANDY LOAM; LOAM; COLLEMBOLA; PESTICIDES; PERSISTENCE

DDT significantly decreased the yield of beans in a sandy loam 16 years after application. More than 50% of applied DDT and arsenic remained in the soil for 15 and 16 years, respectively. Traces of parathion were detected 10 years after application. Arsenic and DDT significantly decreased the N content of bean leaves. The collembolan population was higher in DDT-treated plots than on check plots 6 years after application.

194
Effect of the Soil on the Activity of Pentachlorophenol

Choi, J.; Aomine, S.; Fac. Agric., Kyushu Univ., Fukuoka, Japan

Soil Sci. Plant Nutr. (Tokyo)(SSPNAW) 18(6), 255-60; 1972

CHLOROPHENOLS; SOILS; PH; HERBICIDES; PESTICIDES; WHEAT

195
Persistence of Malathion, S-1,2-Bis(Ethoxycarboxyl)Ethyl-O,O-Dimethyl Phosphorodithioate, in Punjab Soils

Chopra, S.L.; Cirdhar, D.C.; Dep. Chem. Biochem., Punjab Agric. Univ., Ludhiana, India

Indian J. Appl. Chem.(IJACAN), 34(5), 201-7; 1971

MALATHION; DEGRADATION; SOILS; ULTRAVIOLET LIGHT; INSECTICIDES; HUMIDITY; ALKALINE SOILS; ACID SOILS; SANDY LOAM; SAND; LOAM

In Punjab soils Malathion(S-1,2-bis(ethoxycarbonyl) Ethyl o,o-dimethyl phosphorodithbioate) was degraded at rates in the order gamma alkali soil pH 9,3) greater than palampur acid soil pH 5.7) greater than ludhiana sandy loam soil (pH 9.3). The degradation increased with exposure time to ultraviolet light, relative humidity, temperature and concentration.

196
Adsorption and Leaching of Parathion O-O,Di-Ethyl-O-P-Nitrophenyl Phosphorothioate on Soils and Effect of Various Physical Factors on Adsorption

Chopra, S.I.; Das, N.; Das, B.; Punjab Agricultural University, Ludhiana, Punjab, India

J. Indian Soc. Soil Sci., 18(4), 437-446; 1970

SOILS; ADSORPTION; LEACHING; PARATHION; PH; CATIONS; HYDROGEN; CALCIUM; SODIUM, POTASSIUM; MAGNESIUM; MOBILITY

The adsorption of parathion increased with increase in concentration, rise in activation temperature, lowering of pH and increase in organic matter content. Adsorption by homoionic soils was directly related to the percentage saturation by various cations with adsorption decreasing in the order: H+ greater than Ca2+ greater than Mg2+ greater than K+ greater than Na+. Parathion mobility, and therefore leaching, was greater in light than heavy soils.

197
Adsorption and Leaching of Lindane (1, 2, 3, 4, 5, 6-Hexachlorocyclohexane) on Soils

Chopra, S.L.; Goel, B.B.; Dep. Chem. Biochem., Punjab Agric. Univ., Ludhiana, India

Indian J. Appl. Chem.(IJACAN) 1971, 34(6), 265-72; 1971

LINDANE; SOILS; ADSORPTION; LEACHING; INSECTICIDES; FREUNDLICH EQUATION; HUMUS; CATIONS; SAND; CLAY

The adsorption of Lindane on 3 different types of soils increased with an increase in concentration, and obeyed Freundlich equation. Adsorption also increased with the rise in activation temperatures, lowering the pH, and increasing the organic matter content of the soil. Adsorption on homoionic soils was found to be directly related to the percentage of saturation by various cations. Leaching studies revealed that high percentages of sand and low clay content allowed more penetration of Lindane through soil columns.

198
Degradation of Parathion in Soils

Chopra, S.L.; Khullar, P.C.; Dep. Chem. Biochem., Punjab Agric. Univ., Ludhiana, India

J. Indian Soc. Soil Sci. (JINSA4) 1971, 19(1), 79-85; 1971

SOILS; PARATHION; DEGRADATION; PH; RELATIVE HUMIDITY

The degree of Parathion degradation in the soil increased with the Parathion concentration, temperature time of UV exposure, relative humidity, duration of exposure, and soil pH. The degree of Parathion degradation was in the decreasing order: alkali soil, acid soil, normal soil.

199
Residues of Atrazine, 2, Chloro-4-ethylamino-6-isopropylamino-s Triazine in Soils

Chopra, S.L.; Sethi, B.K.; Baweja, A.S.

J. Indian Soc. Soil Sci., 21(3), 315-322; 1973

HERBICIDES; CLAY; ORGANIC MATTER; INCUBATION; TRIAZINE; SOILS; RESIDUES; ATRAZINE

200
Retention of Heavy Metals by Soil

Chowdhury, A.N.; Sarma, B.D.; Ray, M.R.; Geol. Surv. India, Calcutta, India

Geol. Surv. India, Misc. Publ. (GSIMBX) 1972, 16, 743-50; 1972

HEAVY METALS; SOILS; SORPTION; LEAD; NICKEL; COPPER; ZINC;

201
Biological Activity of Southern Soils of Kazakhstan during Herbicide Use

Chulakov, S.A.; Zharasov, S.U.; Inst. Soil Sci., Acad. Sci. Kazakh SSR, USSR

Izv. Akad. Nauk Kaz. SSR Ser. Biol., 11(2), 7-13; 1973

HERBICIDES; LENACIL; YALAN; MOLINATE; SODIUM TCA; CHLORAZONE; SOILS; FUNGI; ACTINOMYCETES; SPORIFEROUS BACTERIA; DECOMPOSITION; TCA; MICROORGANISMS; RO-NEET; RONIT

The effects of the herbicides lenacil, ronit (Ro-Neet), yalan (molinate), sodium TCA, and chlorazone were studied on the biological activity of southern soils of Kazakhstan. Ronit, applied in a dose of 8 kg/ha, slightly reduced the populations of fungi and actinomycetes temporarily while the other pesticides did not cause noteworthy changes in the microorganism counts in the soil. Fungi, actinomycetes, and bacteria were most susceptible to ronit and yalan doses exceeding the recommended doses by 8 to 10 times. Sporiferous bacteria, fungi, and actinomycetes were most susceptible to yalan and ronit. Actinomycetes, TRICHODERMA, PENICILLIUM, FUSARIUM, and CURVULARIA species intensely decomposed sodium TCA; sporiferous bacteria, AZOTOBACTER, CURVULARIA, and PENICILLIUM species decomposed chlorazone. The biologic activity of the soils treated with the herbicides was close to the control level. (13 references)

202
Action and Conversion of Urea Herbicides in Plants and in the Soil

Cizzewska, R.; Pol.

Kosmos (Warsaw), Ser. A(KOSBAV) 1973, 22(2), 107-16; 1973

REVIEW; UREA; HERBICIDES; SOILS; BACTERIA; PLANTS; DEGRADATION

203
Degradation of the Herbicide Isopropyl-N-Phenyl Carbamate by ARTHROBACTER and ACHROMOBACTER Species from Soil

Clark, C.G.; Wright, S.J.L.; Bath University Technol., Claverton Down, England

Soil Biol. Biocem., 2(4), 1970, 217-226; 1970

BACTERIAL METABOLISM; DEGRADATION; HERBICIDES; SOILS; IPC; ISOPROPYL N-PHENYLCARBAMATE; ANILINE; CATECHOL; PHENYLCARBAMATE; ENZYME; PERSISTENCE

ARTHROBACTER and ACHROMOBACTER species from soil degraded isoprophyl n-phenylcarbamate (IPC) at similar rates via aniline with concomitant detoxication. Aniline was readily metabolized, possibly through catechol, and did not accumulate in cultures growing on IPC. Evidence shows that the conversion of phenylcarbamates to the corresponding aniline compound is a mechanism widely used by soil microbes to initiate degradation of these herbicides, and the enzyme system for aniline formation is associated with the "cell envelope". Application of IPC to soil in organic liquid formulations is unlikely to prolong persistence.

204
The Persistence of Simazine in a Range of Soils in Selected Areas of the United Kingdom

Clay, D.V.; Davison, J.G.; ARC Weed Res. Organization, Oxford, England

Proc. 10th br. Weed Control Conf. 821-825; 1970

BIOASSAY; PERSISTENCE; SIMAZINE; SOILS; LOAM; SILT

Bioassay showed that 10% or less of the simazine applied in spring persisted in the light and average soils in autumn. The largest residue occurred on a silt loam soil in a dry area of England.

205
The Persistence of Chlorthiamid Lenacil and Simazine in Uncropped Soil

Clay, D.V.; McKone, C.E.

Part of Bawden, Sir Fredrick (President). Proceedings of the 9th British Weed Control Conference held Nov. 18-21, 1968 at Wrighton, England. Symposium. (Vol. 1) 533-1045; (Vol. 2) 1053-1368; (Vol. 3) 933-938; 1968

HERBICIDES; DEGRADATION; SOILS; PERSISTENCE; CHLORTHIAMID; LENACIL; SIMAZINE

206
The Tolerance of BlackCurrants to Chlorthiamid and Dichlobenil; Effects on Growth and Yield and Residues in the Soil

Clay, D.V.; McKone, C.E.; Arc. Weed Res. Organization, Oxford, England

Proc. 10th Br. Weed Control Conf., 781-787; 1970

BLACKCURRANTS; CHLORTHIAMID; DICHLOBENIL; SOILS; HERBICIDES; PERSISTENCE

A year after application 90% of the annual applications of the herbicides had disappeared.

207
Persistence and Penetration of Large Doses of Simazine in Uncropped Soil

Clay, D.V.; Stoot, K.G.; Agric. Res. Counc. Weed Res. Organ., Begbroke Hill/Yarnton/Oxford, England

Weed Res.(WEREAT), 13(1), 42-50; 1973

SIMAZINE; PERSISTENCE; SOILS; HERBICIDES; DRAINAGE; PENETRATION; RESIDUES

The total simazine residue present in the soil 12 months after the last of 3 annual simazine applications (2.8 kg/ha), and 8 months after the last of 5 annual simazine applications (5.6 kg/ha), was less than 10% of the annual amount of simazine applied. An average simazine residue of 1.7 kg/ha was found in plots 2 1/2 years following the last of 2 annual applications (22.4 kg/ha). This residue decreased about 25% during the next 12 months. The highest simazine concentrations were in the surface layers of the soil, but residues were detected to a depth of 60 cm 3 1/2 years after the last simazine application (22.4 kg/ha). The variation in these soil residues is apparently due to different soil, climatic, and drainage conditions.

208
Movement and Persistence of Dieldrin and Lindane in Soil as Influenced by Placement and Irrigation

Cliath, M.M.; Spencer, W.F.; Soil Water Conserv. Res. Div., Agric. Res. Serv., Riverside, Calif.

Soil Sci. Soc. Amer., Proc.(SSSAA8) 1971, 35(5), 791-5; 1971

INSECTICIDES; SOILS; VOLATILITY; DIELDRIN; PERSISTENCE; LINDANE; RESIDUES; PESTICIDES; MOBILITY; TRANSPORT; PCCH; GAMMA-PENTACHLOROCYCLOHEXENE; IRRIGATION

Insecticide volatilization can be reduced by keeping the soil surface dry and by incorporating or injecting the insecticides into the soil. Redistribution and recovery of Dieldrin and Lindane were measured in two calcareous, low organic-matter soils, with or without irrigation. Dieldrin and Lindane were thoroughly mixed with soil at 0-7.5 or 7.5-15 cm depths. Dieldrin was stable and persistent, but volatilization was a pathway for Dieldrin loss when the surface coil was wet and Dieldrin was placed in the surface layer of soil. Dieldrin did not move significantly with water, and moved little by diffusion, either upward or downward. No catalytic breakdown of Dieldrin occurred in hot-dry soil. The movement and dissipation of Lindane from both soils were greater than for Dieldrin. Lindane moved downward with water application. Lindance was lost by volatilization and also by degradation, as considerable amounts of Gamma-penthachlorocyclohexene were found in the soil extract.

209
Dissipation of Pesticides from Soil by Volatilization of Degradation Products. I. Lindane and DDT

Cliath, M.M.; Spencer, W.F.; Soil Water Conserv. Res. Div., USDA, Agric. Res. Serv., Riverside, Calif. 92502

Environ. Sci. Technol.(ESTHAG), 6(10), 910-914; 1972

ORGANOCHLORINES; INSECTICIDES; MOBILITY; VOLATILITY; SOILS; LINDANE; LOSS; DDT; DISSIPATION; PCCH; DDE

The presence of degradation products in significant amounts in field soils indicated that volatilization of degradation products such as PCCH and DDE, can be a major pathway for loss of some organochlorine insecticides from soil.

210
Interactions Between Pesticides and the Mineral Fraction of Soils

Cloos, P.; Fac. Sci. Agron., Univ. Cathol., Louvain, Belgium

Pedologie(PEDOAZ) 1972, 22(2), 148-73; 1972

REVIEW; SOILS; PESTICIDES; MINERAL FRACTION; MECHANISM; ADSORPTION; CLAY; ION EXCHANGE; PROTONATION; HYDROGEN; HYDROGEN BONDING; ION-DIPOLE; PI-BONDING; ELECTRON; VAN DER WAALS FORCE; CATALYSIS; DECOMPOSITION

211
Absorption Metabolism and Translocation of 2,4,-D by Honeyvine Milkweed-D

Coble, H.D.; Slife, F.W.; Butler, H.S.

Weed Sci., 18(5), 1970, 653-656

HERBICIDES; ABSORPTION; METABOLISM; TRANSICCATION; 2,4-D; HONEYVINE; MILKWEED

212
Correlation Between the Degradation Dynamics of some Herbicides and their Efficiency

Coha, F.; Janjic, V.; Misovic, M.

Agrohemija, (1-2), 1971 (Recd 1973), 43-50

ISOPROPYL-N-3-CHLOROPHENYL CARBAMATES; ALPHA CHLORO-N-N-DIALLYL ACETAMIDES; WEED CONTROL; CARBAMATES; DEGRADATION; HERBICIDES; EFFICIENCY

213
Sorption And Phytotoxicity of Triazine Herbicides in Neutral and Calcareous Soils

Colbert, F.O.; Oregon State Univ., Corvallis, Oreg.

(DABSAQ) 1971, 74p.; 1971

TRIAZINE; SOILS; HERBICIDES; PHYTOTOXICITY

A disser.

214
Perfusion Studies with Bromoxynil Octanoate in Soil

Collins, R.F.; Research Laboratories, May and Baker Ltd., Dagenham, Essex, Rmic 7Xs, United Kingdom

Pestic. Sci., 4(2), 1973, 181-192; 1973

HERBICIDES; BROMOXYNIL OCTANOATE; SOILS; DEGRADATION; CARBON DIOXIDE; LEACHING; TRACER; PERFUSION

The breakdown of bromoxynil octanoate in five different soil types was studies in a soil perfusion apparatus using herbicide labelled with C14 in the Cyano group or in the aromatic ring. Even when applied at rates equivalent to 5 to 25 times those used commercially, the herbicide was fairly rapidly and extensively degraded at 15. after 12 to 13 weeks, up to 80% of the radioactivity in the 14CN group and up to 63% of the C14 in the ring were liberated as CO2. 16 to 19% of the radioactivity from ring-labelled herbicide remained attached to the soil, probably not as the original herbicide, but in a form not readily leached. Only trace quantities of 3,5-dibromo-4-hydroxy-benzamide (0.5%) and 3,5-dibromo-4-hydroxybenzoic acid (0.1%) were detectable during these soil perfusions.

215
Fate of 2-Methyl-2-Methylthio Propionaldehyde O-Methylcarbamoyloxime TEMTK in Cotton Plants and Soil

Coppedge, J.R.; Lindquist, D.A.; Bull, D.L.; Dorough, H.W.

J. Agr. Food Chem., 15(5), 902-910; 1967

SOILS; 2-METHYL-2-METHYLTHIO PROPIONALDEHYDE O-METHYLCARBAMOYL OXIME; TEMIK; COTTON; PLANTS

216
Influence of Ph on the Phytotoxicity of Herbicides in Soil

Corbin, F.T.; Upchurch, R.P.; Selman, F.L.; Agric. Exp. Stn., North Carolina State Univ., Raleigh, N. C.

Weed Sci.(WEESA6) 1971, 19(3), 233-9; 1971

HERBICIDES; SOILS; PHYTOTOXICITY; DICAMBA; 2,4-D; PROMETONE; AMITROLE; DALAPON; DIQUAT; PARAQUAT; NITRALIN; DIURON; ISOCIL; DICHLOBENIL; PICLORAM; CHLORAMBEN

The phytotoxicity of weak aromatic acid herbicides, such as Dicamba and 2,4-D, and weak base herbicides, such as Prometone and Amitrole increased with the increase of soil pH, and was maximum at pH 6.5. The phytotoxicity increased as soil pH decreased, and reached a maximum at pH 4.3, for Dalapon, Diquat, and Paraquat. Soil pH of 4.3-7.5 has no effect on the phytotoxicity of Chloramben, Picloram, Dichlobenil, Isocil, Diuron, and Nitralin.

217
Effect of Phosphate and Other Anions on Trimethylarsine Formation by CANDIDA HUMICOLA

Cox, D.P.; Alexander, M.; Dep. Agron., Cornell Univ., Ithaca, N. Y.

Appl. Microbiol.(APMBAY), 25(3), 408-13; 1973

METHYLARSINE; PHOSPHATES; ARSENIC; METABOLITES; SOILS; MICROS; PESTICIDES

218
Model of the Circulation of DDT on Earth

Cramer, J.; Stone & Webster Engineering Corp., 225 Franklin St., Boston, MA 02107

Atmospheric Environment, 7(3), 241-256; 1973, March

DDT; CIRCULATION; DEGRADATION; MODEL; BIODEGRADATION; ATMOSPHERE; LAND; SEA; AQUATIC PLANKTON; RESERVOIRS; MARINE PHYTOPLANKTON; ABSORPTION; PHYTOPLANKTON; ZOOPLANKTON; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS; TRANSPORT; AIR

A model is developed to predict the global distribution and accumulation of DDT. The model considers the land, atmosphere, shallow sea, and aquatic plankton as reservoirs for DDT. Reasonable values for the rates of transfer between reservoirs and rates of chemical and biological degradation of DDT are estimated. The parameters of the model were systematically varied to determine the most critical parameters for the predicted results. Two hypothetical alternative rates of future DDT usage are considered: the continued rate of DDT usage at the 1970 level and the zero rate of DDT usage after 1970. The time required to return to equilibrium after the termination of DDT usage cannot be precisely determined but lies somewhere between 25 and 110 years. Most of the decrease in the concentration levels of DDT, however, occurs in the early years. The concentration of DDT in marine life is already near its equilibrium values and should not increase significantly in the future. The rates of degradation of DDT, the amount of DDT which enters the atmosphere, the rates of transfer between the deep and shallow seas, and the rates of direct absorption of DDT by phytoplankton and zooplankton are critical factors in a model of DDT circulation and distribution.

219
The Microbial Breakdown of Pesticides

Cripps, R.E.; Shell Res. Ltd., Borden Microbiol. Lab., Sittingbourne, Kent, England

Soc. Appl. Bacteriol. Symp. Ser. 1: 255-266; 1971

BREAKDOWN; PESTICIDES; CHLORINE; CARBON; AMINO ACIDS; DEGRADATION; MICROBES

An ether linkage, chlorine atoms, branched carbon chains, or substituted amino groups substitents often found in pesticidal molecules and their residues, increase resistance to microbial degradation by a molecule. The position of substituents also has a marked effect on the rate of degradation. Pure cultures of organisms have been found which will degrade some of the more recalcitrant molecules, suggesting that more research is needed before it will be possible to predict the biodegradability of a compound solely on the basis of its structure.

220
Laboratory Study of the Effects of some Soil-Applied Organophosphorus Pesticides on CARABIDAE (COLEOPTERA)

Critchley, B.R.; Imp. Coll. Sci. Technol., London, Engl.

Bull. Entomol. Res.(BEREA2) 1973, 62(2), 229-42; 1973

ORGANOPHOSPHORUS INSECTICIDES; SOILS; THIONAZINE; PHORATE; NEBRIA; BEETLES; INSECTS; INSECTICIDES

221
The Nonmetabolic Decomposition of Pesticides

Crosby, D.G.

Ann. N.Y. Acad. Sci., 160(1), 82-96; 1969

DECOMPOSITION; PESTICIDES

222
Fate of Pesticides in the Environment

Crosby, D.G.; Dep. Environ. Toxicol., Univ. California, Davis, Ca

Annu. Rev. Plant Physiol.(ARPPA3) 1973, 24, 467-92; 1973

REVIEW; PESTICIDES; FATE; OXIDATION; REDUCTION; HYDROLYSIS; NUCLEOPHYLLIC REACTION; CONJUGATION; METABOLISM; TRANSFORMATION; BIOTA; SOILS; AQUATIC ECOSYSTEMS; AIR; WATER; ATMOSPHERE

A review of the biological and nonbiological transformations (oxidation, reduction, hydrolysis, nucleophilic reaction, conjugation, metabolism, etc.) and fate of pesticides, especially plant-related compounds, in the biota, soil, aquatic, and air environments, with 235 references.

223
Photodecomposition of Chlorinated Biphenyls and Dibenzofurans

Crosby, D.G.; Moilanen, K.W.; Dept. of Environmental Toxicology, University of California, Davis, CA

Bulletin of Environmental Contamination and Toxicology, 10(6), 372; 1973, Sept.

PHOTODECOMPOSITION; CHLORINATED BIPHENYLS; DIBENZOFURAN; DEGRADATION; PCB; CHROMATOGRAPHY; IRRADIATION; ISOMERS

224
Photo Nucleophilic Reactions of Pesticides

Crosby, D.G.; Moilanen, K.W.; Nakagawa, M.; Wong, A.S.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. Oiso, Japan, October, 1971. Academic Press: New York, N.Y., U.S.A.; London, England. 1972 (p. 423-433) 637p.; 1972

TRANSFORMATION; PHOTO NUCLEOPHILIC; PESTICIDES

225
The Hazards of Impurities

Crossland, J.; Shea, K.P.

Environment, 15(5), 35-38; 1973, June

INDUSTRY; CHLORINATED HYDROCARBONS; DEGRADATION; HAZARDOUS CHEMICALS; HAZARDS; HERBICIDES; PESTICIDES; SOILS; PERSISTENCE; DIOXINS; FURAN

The danger of toxic contaminants in agricultural chemicals is outlined. The persistance in soils of toxic dioxins and furans, break down products of pesticides, are investigated.

226
Surface Chemistry of Pesticide Soil Interactions

Cruz, M.; White, J.L.

Part of Coulston, F. and Korte, F. (Ed.). Environmental Quality and Safety. Chemistry, Toxicology and Technology, Vol. 1. Global Aspects of Chemistry, Toxicology and Technology as Applied to the Environment. Georg Thieme Publishers: Stuttgart, West Germany; Academic Press: New York, N.Y., 1972 (p. 221-229) 267 p.; 1972

SURFACE; PESTICIDES; SOILS

227
Interaction Between Herbicides and Soil Microorganisms

Cullimore, D.R.

Residue Rev., 35, 65-80; 1970

HERBICIDES; SOILS; MICROORGANISMS; DEGRADATION; THEORY; REVIEW

A theoretical hypothesis is formualted which indicates that 5 major types of herbicide could be defined by these interactions in both primary and secondary treatments. A survey is made of the known inhibitory effects of herbicides on micro-organisms. Some of the more recent work on the degradation of herbicides is included.

228
The Adsorption and Mobility of Paraquat on Different Soils and Soil Constituents

Damanakis, M.; Drennan, D.S.H.; Fryer, J.D.; Holly, K.

Weed Res., 10(3), 164-277; 1970

ADSORPTION; MOBILITY; PARAQUAT; SOILS; BIOASSAY; HERBICIDES

229
The Biotransformation of Organomercury Compounds

Daniel, J.W.

Biochem. J., 130(2), 64P-65P; 1972

BIOTRANSFORMATION; ORGANOMERCURIALS; MICROORGANISMS; RATS; LIVER; FUNGICIDES; SOILS; MERCURY

230
Effect of Pretreatment Environment on 2,4-D Phytotoxicity

Darvent, A.L.; Behrens, R.; Dep. Agron. Plant Genet., Univ. Minnesota, St. Paul, Minn.

Weed Sci.(WEESA6), 20(6), 540-4; 1972

CHLOROPHENOXYACETATE; PHYTOTOXICITY; HERBICIDES; 2,4-D; PLANTS; PEAS; VELVETLEAF

Pretreatment light, temperature, and humidity conditions played only a minor role in determining the response of peas (PISUM SATIVUM) and velvetleaf (ABUTILON THEOPHRASTI) to 2,4-D. Growth of pea plants in growth chambers under solar or fluorescent-incandescent lamp radiation, at high or low humidity, or at temperatures between 10 and 25 degrees did not influence the growth inhibition produced by 2,4-D at ester (0.14 or 0.28 kg/ha) or 2,4-D alkanolamine salt (0.84 or 1.68 kg/ha). Herbicide uptake and translocation were greater when pretreatment pea growth was under solar radiation, but spray retention and rate of 2,4-D metabolism were not affected by type of pretreatment radiation. The response of velvetleaf to 2,4-D was slightly greater when pretreatment growth was under solar than under artificial radiation, at high than at low humidity, and at high than at low temperature.

231
Transport of Picloram in Relation to Soil Physical Conditions and Pore Water Velocity

Davidson, J.M.; Chang, R.K.; Oklahoma State University, Stillwater

Soil Sci. Soc. Am. Proc., 36(2), 257-261; 1972

HERBICIDES; ADSORPTION; MISCIBLE; DISPLACEMENT; DIFFUSION; TRANSPORT; PICLORAM; SOILS; WATER; LOAM; MOBILITY; PORE WATER VELOCITY; FLOW RATE

In an initially herbicide-free norge loam soil, picloram mobility was significantly reduced by decreasing the average pore-water velocity from 5.8 to 0.59 cm/hr. A variation in herbicide adsorption with pre-water velocity was observed at each bulk density (1.55 and 1.65 g/cm3), and aggregate size (less than 2.0 and less than 0.42 mm). For a specific bulk density, picloram adsorption was greater when the largest soil aggregate size was less than 0.42 mm than when the soil contained less than 2.0 mm aggregates. The average pore-water velocity influenced picloram movement more significantly than bulk-density variations, or largest aggregate size at a given flow rate.

232
Herbicide Distributions Within a Soil Profile and Their Dependence Upon Adsorption-Desorption

Davidson, J.M.; Mansell, R.S.; Baker, D.R.; Dept. of Agronomy, Oklahoma State University, Stillwater, Okla.

Soil Crop Sci. Soc. Fla., Proc. (SCSFAD), 32, 36-41; 1973

HERBICIDES; SOILS; MATHEMATICAL MODEL; ADSORPTION; DESORPTION; KINETICS; MODEL

233
Experimental and Predicted Movement of Three Herbicides in a Water-Saturated Soil

Davidson, J.M.; McDougal, J.R.; Dep. Agron., Oklahoma State Univ., Stillwater, Ok

J. Environ. Qual.(JEVQAA) 1973, 2(4) 428-33; 1973

SOILS; HERBICIDES; ADSORPTION; DESORPTION; PORE WATER VELOCITY; EQUILIBRIUM; CONVECTIVE TRANSPORT EQUATION; PICLORAM; PROMETRYNE; FLUOMETURON; WATER; SATURATION; CALCIUM; LOAM; FREUNDLICH EQUATION; MOBILITY; MODEL; DISTRIBUTION; TAILING

The equilibrium adsorption characteristics of fluometuron, picloram, and prometryne, on calcium-saturated norge loam soil fitted the Freundlich equation. A solution of each herbicide was displaced through a water-saturated soil column at various average pore-water velocities (5.6-0.57 cm/hr), and effluent sample was evaluated to determine the importance of adsorption kinetics to herbicide mobility. The displacement of each herbicide was influenced by the average pore-water velocity. More herbicide was adsorbed by the soil when displayed at a pore-water velocity of 0.57 as compared to 5.6 or 2.75 cm/hr. The use of a time-dependent adsorption model in the convective transport equation (Oddson, J.K. et al., 1970) did not predict the shape of the effluent concentration distribution at the high pore-water velocities, but reflected the left-hand shift exhibited by the data. The tailing noted in all the herbicide effluent concentration distributions, resulted from the nonsingularity between the adsorption-desorption process.

234
DDT Residues in a Vineyard Soil after 24 Years of Exposure

Davis, A.C.; Taschenberg, E.F.

Bulletin of Environmental Contamination and Toxicology, 8(6), 329-333; 1972, Dec.

SOIL SAMPLING; DDT; INSECTICIDES; VINEYARDS; DDE; SOILS; LEACHING; DRIPLINE AREA; DECOMPOSITION; VOLATILIZATION; DEGRADATION

The findings from soil samples from vineyard plots sprayed annually for 24 years with DDT are presented. The percentage of total residue recovered as DDE increased with time. The percentage of DDT and DDE recovered from the soil with respect to the amount of DDT applied to the vineyard decreased with time. Although the physical properties of the vineyard soil were favorable to leaching, most of the DDT and DDE remained in the top 3 in of soil. Most of the DDT and DDE was present in the dripline area, which receives the maximum deposit from drip from the vines, runoff from the sides of the hooded sprayer, and residues from weathered foliage accumulated in the soil. There was an increase in the amount of DDT recovered from the untreated check plots with respect to time. The rate of DDT decomposition and volatilization was slower after treatment ceased. DDT applied to vineyard soil used in this experiment was either volatilized or slowly degraded primarily to DDE.

235
Picloram Movement from a Chaparral Watershed

Davis, E.A.; Ingebo, P.A.; U.S.D.A. Forest Serv., Rocky Mountain Forest Range Exp. Station Forest Hydrol. Lab., Tempe, AZ 85281

Water Resour. Res., 9(5), 1304-1313; 1973

PICLORAM; MOVEMENT; CHAPARRAL WATERSHED; WATERSHEDS; STREAMS; HERBICIDES; CROPSS; WATER; RAINFALL

Picloram residues found in a stream at the outlet of a watershed treated over 4.5% of its area with pellets of the herbicide were highest during the first three months and declined to nondetectable levels within 14 months. Maximum concentrations measured were 350 to 370 ppb, and direct use of stream water from the outlet of the watershed when levels were between 46 and 370 ppb could have been detrimental to sensitive crops. After 40 inches of accumulated rainfall, when no picloram was observed in the stream, it was estimated that 4.5% of the applied material had been lost to the water.

236
Horticulture and Pollution

Day, B.E.

Hort. Science 5(4), 237-239; 1970

SOILS; WATER; AIR; PESTICIDES; SALINITY; HORTICULTURE

237
Formulation of Dalapon to Reduce Soil Contamination

Day, B.E.

Weed Research, 1, 177; 1961

DALAPON; SOILS

238
Volatility of Herbicides Under Field Conditions

Day, B.E.; Johnson, E.; Dewlen, J.L.

Hilgardia, 28, 255; 1959

HERBICIDES; VOLATILIZATION

239
Adsorption of Nonionized Molecules of Herbicides by Organic Soil Material

de Borger, R.; Inst. Rech. Chim., Minist. Agric., Tervuren, Belgium

Rev. Agr. (Brussels)(RVAGAE), 1972, 25(2), 201-8; 1972

REVIEW; HERBICIDES; ADSORPTION; SOILS; HUMUS; TRAIZINE; UREA; NONIONIZED HERBICIDE MOLECULES

A review with 18 refs. Of the mechanism of adsorption of nonionized herbicide mols., such as triazines and ureas, by org. Soil matter.

240
The Bacterial Degradation of 5 Amino-4-Chloro-2-Phenyl-3 2H Pyridazinone

de Frenne, E.; Eberspaecher, J.; Lingens, F.; Institute fur Mikrobiol, Molekularbiol. University Hohenheim, Stuttgart-Hohenheim, Germany

Eur. J. Biochem., 33(2), 1973, 357-363; 1973

HERBICIDES; DEGRADATION; SOILS; PYRAZON; CARBON; METABOLITES; DECOMPOSITION; PYRAZON-DEGRADING BACTERIA

Soil bacteria capable of utilizing pyrazon as the sole source of carbon metabolized the herbicide to 5-amino-4-chloro-2-(2,3-cis-dihydroxy-cyclohexa-4,6-diene-1-71) 3(2H)-pyridazinone (I), 2-(5-amino-4-chloro-3-oxo-2,3-dihydro-2-pyridazino)-cis. cis-muconic acid (II), 2-pyrone-6-carboxylic acid (III), and 5-amino-4-chloro-3(2H-pyridazinone (IV). Compound (I) was detected 30 hours after inoculation and reached a maximum at 38 to 40 hours. Compounds (II) and (II)i appeared about 30 hours after inoculation, and maximum concentrations were observed at about 50 hours; compound (I)v, detected at 20 hours, continued to increase. Only compound (I) and its decomposition products could be utilized as carbon sources by the bacteria, and non microorganisms have been isolated which can metabolize (IV). Cell-free extracts of the pyrazon-degrading bacteria exhibited 2-hydroxy-muconic acid decarboxylase activity, supporting the proposal that the acid could be a product of the metabolism of (II) and be rapidly removed.

241
Terminal Residues of Dithiocarbamate Fungicides .

Dekhuijzen, H.M.; Vonk, J.W.; Kaars Sijpesteijn, A.; Inst. Org. Chem., Tno, Utrecht, Netherlands

Pestic. Terminal Residues, Invited Pap. Int. Symp.(25RHAY) 1971, 233-41; 1971

REVIEW; THIOCARBAMATE; FUNGICIDES; METABOLISM; THIRAM; NABAM

A review with 25 references the metabolism of 2 types of dithiocarbamate fungicides such as thiram or nabam with different terminal residues is discussed.

242
Copper-Organic Matter Complexes in a Podzol Developed on the Landos Sands and Accidentally Enriched with Copper

Delas, J.

Annls Agron., 18, 17-29; 1967

IRON; HUMUS; PODZOL; COPPER; FUNGICIDES

In a Fe-humus podzol treated with Cu fungicides to toxic levels 50 years ago, Cu was bound to the most mobile fraction of the organic matter by stable bonds, some of which occurred in electro-negative complexes.

243
Pesticides and the Biosphere

Desi, L.; Erdos, G.; Kozeges, Int., Budapest

Egeszsegtudomany, 17(2), 181-191; 1973

PESTICIDES; BIOSPHERE; SOILS; WATER; AIR; FISH; BIRDS; HUMANS; TERRESTRIAL ECOSYSTEMS; AQUATIC ECOSYSTEMS

The transmission of pesticidal contamination in various sectors of the biosphere (soil, water, air): effects of pesticides on useful species such as game, fish and bird; effects on man living in a close interrelationship with his environment. Based on the strength of personal experience possibilities for the early detection of minor pesticide induced impairments are presented. Finally, conclusions are drawn from the experiments, whereby the risk of environmental contamination can be averted.

244
Dieldrin On and Around Cranberry Bogs

Deubert, K.H.; Massachusetts University, East Wareham, MA

Research Bulletin, Massachusetts Agricultural Experiment Station, No. 593, 18p.; 1971

DIELDRIN; CRANBERRY BOG; SEDIMENTS; VERTICAL MOVEMENT; SOILS; BOG; LEACHING; ABSORPTION; SAND; PEAT; FLOODING; ESTUARINE WATER; SHELLFISH

Results of laboratory and field experiments showed that vertical movement of dieldrin is minimal in bog soil. In 6 cranberry bogs, 87% of the applied dieldrin remained in the 0-2in. layer, 13% in the 2 to 4 inch layer, 2.6% in the 4 to 8 inch. layer, and 0.4% in the 8 to 12 inch layer. 25% of the dieldrin applied at 1 to 3 lb/acre disappeared within 1 year, and 95% in an average of 8 years. The results of laboratory leaching experiments showed that absorption of dieldrin was only 10% in a column of sand but that it reached 90% in a column composed of alluvate layers of sand and peat. With successive floodings of bog soils, less dieldrin was removed at each flood. Dieldrin in bottom sediments, estuarine water and shellfish was also studied.

245
Soil Characteristics Influence Dieldrin Adsorption

Deubert, K.H.

Part of Swader, F.N. (Chairman). Cornell University Conference on Agricultural Waste Management 1970. Relationship of Agriculture to Soil and Water Pollution. Agricultural Waste Management Program, Cornell University: Ithaca, N.Y., 1970 (p. 164-170) 270p.

SOILS; DIELDRIN; ADSORPTION

246
DDT Residues in Robins and Earthworms Associated with Contaminated Forest Soils

Dimond, J.B.; Belyea, G.Y.; Kadunce, R.E.; Univ. Maine, Orono, Maine

Can. Ent., 102, 1122-1130; 1970

DDT; ROBINS; EARTHWORMS; SOILS; FORESTS; PERSISTENCE

Residue analysis of forest soils sprayed once at 1 lb/acre showed little breakdown of DDT through 9 years after application. Persistent residues were largely restricted to the upper soil litter. Residues passed from soils to earthworms to robins throughout the 9-year period studied. It is suggested that this relationship may persist for as long as 30 years after a single application to the forest.

247
Cycling and Effects of Chlorine labeled DDT on Soil Invertebrates

Dindal, D.L.; State Univ. of New York, Syracuse, NY. Coll. of Environmental Science and Forestry

Coll. of Environmental Science and Forestry, Contract at (11-1)-3474 (COO--3474-1), State University of New York, Syracuse, NY, Annual Progress Report

INVERTEBRATES; DDT; DISTRIBUTION; METABOLISM; SOILS; TERRESTRIAL ECOSYSTEMS; TRACER; CYCLING; CHLORINE

248
Exchange of Diquat-2 Plus in Soil Clays Vermiculite and Smectite

Dixon, J.B.; Moore, D.E.; Agnihotri, N.P.; Lewis, D.E.; Auburn University Agricultural Experimental Station, Auburn, Alabama

Soil Sci. Soc. Amer. Proc., 34(5), 1970, 805-808; 1970

POTASSIUM; HERBICIDES; SOILS; CLAY; VERMICULITE; SMECTITE; DIQUAT; MONTMORILLONITE

A direct relationship was shown between K+-diquat2+ exchange and layer-charge density of smectites and vermicultites. Hydroxy-al interlayers had little influence on the exchange of diquat2+ in vermiculite and montmorillonite. The exchange ability of diquat2+ in a group of various soil clays was direclty related to vermiculite content. Exchangeability of diquat2+ in montmorillonitic houston and iredell soil clays, and their K+-fixing ability on oven drying, indicate that vermiculite may have an important influence on their K+-exchange reactions.

249
Interactions of Soil Microbes and Pesticides

Domsch, K.H.

Part of Szegi, J. (Ed.). Symposia Biologica Hungarica, Vol. 11. Proceedings of the Symposium on Soil Microbiology. Budapest, Hungary. June 16-20, 1970. Akademiai Kiado: Budapest, Hungary. 1972 (p. 337-347) 454p.; 1972

DEGRADATION; SOILS; PESTICIDES; CAPTAN; BIODEGRADATION; FUNGICIDES; CUTIN; XYLAN; CELLULOSE; GLUCOSE; CHITIN; PECTIN

250
Residues in Corn and Soils Treated with Technical Chlordane and High Purity Chlordane HCS-3260

Dorough, H.W.; Pass, B.C.

J. Econ. Entomol., 65(4), 1972, 976-979

RESIDUES; CORN; SOILS; CHLORDANEICHS-3260; PESTICIDES

251
Residues in Alfalfa and Soils Following Treatment with Technical Chlordane and High Purity Chlordane (Hcs 3260) for Alfalfa Weevil Control

Dorough, H.W.; Skrentny, R.F.; Pass, B.C.; Dep. Entomol., Univ. Kentucky, Lexington, Ky

J. Agr. Food Chem. (JAFCAU) 1972, 20(1) 42-7; 1972

CHLORDANE; ALFALFA; RESIDUES; INSECTICIDES; SOILS; HEPTACHLOR; HEPTACHLOR EPOXIDE

Following the treatment of alfalfa with technical Chlordan, or high-purity chlordan, at a rate of 1 lb active ingredient/acre, the total residues of Alpha-chlordan, Gamma-chlordan, Heptachlor, and Heptachlor epoxide on the alfalfa were 29 and 130 ppm for technical chlordan and high-purity chlordan, respectively. In all tests, 95% of the residues disappeared after 21 days. Three days of field-curing freshly cut alfalfa reduced the level of residues by 55%. Maximum total residues in soil were 0.6 ppm, following the treatment of alfalfa cultures with high-purity chlordan at a rate of 2 lb active ingredient/acre. By 21 days these residues had declined by 50%; and by 180 days, 83% of the residues had dissipated.

252

Organic Herbicide in Agriculture

Drees, H.; Bonn, Germany

Gesunde Pflanz., 24(9), 152-158; 1972

HERBICIDES; PHENOXYACETIC ACIDS; TRIAZINES; UREA DERIVATIVES; RATS; FISH; 2,4,5-T; TERBUTRYNE; PERSISTENCE; METHABENZTHIAZURON; PHENOL; BROMOFENOXIM; DINITROPHENOLS; PESTICIDES; SOILS; ORGANIC HERBICIDES; AGRICULTURE

About 18,500 tons of pesticide active ingredients were applied in West Germany in 1971; 60% of this amount represented herbicides. Almost half of the quantity of herbicide applied, or 5200 tons, consisted of phenoxyacetic acids; triazines and urea derivatives accounted for 38% of the herbicides applied. More than one third of the arable land in West Germany was treated with herbicides in 1971. The growth-regulating herbicides (phenoxy acids) have oral LD50 doses in rats of about 0.7-1.2 g/kg; tolerance for these herbicides in or on grain are in the range of 0.05-0.1 ppm. Fish toxicity and possible dioxin contamination are problems with 2,5,4-T. A typical triazine herbicide, terbutryne, has an LD50 of about 3 g/kg in the rat; the tolerance is 0.05 ppm. Terbutryne has limited persistence in soil - 3-10 weeks, depending on the soil type. Substituted urea herbicides, e.g., methabenzthiazuron, persist in soil for about 4-6 months; the LD50 is about 2.5 g/kg. Miscellaneous chemical classes include phenolics (e.g., bromofenoxim, LD50 1.2 g/kg) and dinitro compounds (oral LD50 in the rat less than 0.05 g/kg). The nitro compounds are also dangerous to bees. Numerous combinations of active ingredients are marketed.

253

Decomposition of Pyrimidine Derivatives in Soil. The Effect of Specific Microflora and Specific Preincubation

Drobnikova, V.; Pospisilova, V.; University Prague, Czechoslovakia

Zentralblatt fur Bakteriologie. Parasitenkunde. Infektionskrankheiten und Hygiene, Zweite Abteilung, 127(1), 98-112; 1972

DECOMPOSITION; PYRIMIDINE; SOILS; MICROFLORA; INCUBATION; THYMINE; URACIL; CHERNOZEM; OXIDATION; RENDZINA; RESPIRATION CURVE

The basic types of respiration curves of thymine and uracil showed that both substrates underwent oxidation in a chernozem, apparently due to the presence of the enzyme-complex uracil-thymine-oxidase; only thymine was oxidized in a rendzina that lacked this enzyme-complex. Specific preincubation promoted the process of oxidation, and the same occurred when specific bacteria (growing on thymine and uracil) isolated from the chernozem were inoculated into the soils.

254

Decomposition of DDT in Soil by Microorganisms

Drui, E.G.; Gar, K.A.; Khokhryakova, V.S.; Vsesoyuznyi Nauchno-Issledovatel'skii Institut Khimicheskikh Sredstv Zashchity Rastenii, Moscow, USSR

Dokl Akad Nauk Sssr Ser Biol 200 (4). 1971 (Recd 1972) 977-979.; 1971

ANAEROBIC; AEROBIC; METABOLISM; DDT; DDD; DDE; SOILS; SACCHAROSE; DECOMPOSITION; MICROORGANISMS; 2,4-D

In complete Czapeck medium, soil microorganisms converted about 50% of added 4,4'-DDT to DDD and the other 50% into water-soluble and volatile compounds. In Czapeck medium lacking saccharose, the corresponding figures were 30% and 70%. Decomposition of 4,4'-DDT in columns of Chernozem soil was more rapid in non-sterile soil than in sterile soil and was practically complete in anaerobic non-sterile soil. Decomposition of 2,4'-DDT occurred in anaerobic but not in aerobic sterile soil and was practically complete in anaerobic non-steril soil. During decomposition, a large amount of DDD was formed under anaerobic conditions, whereas under aerobic conditions some DDE was formed. DDE and DDD were decomposed in sterile and non-sterile soil.

255

DDT Decomposition in Soil Under the Influence of Microorganisms

Drui, E.G.; Gar, K.A.; Khokhryakova, V.S.

Dokl. Akad. Nauk SSSR, 200(4), 977-979; 1971

DDT; DDD; DDE; WATER; DETOXIFICATION; VOLATILIZATION; SOILS

Soil microorganisms decomposed DDT to DDD, DDE, water soluble, and volatile products under laboratory conditions. The metabolic rate of the microorganisms was significantly higher under anaerobic conditions. DDT detoxication in soil may be increased by creating conditions favorable for the development of microorganisms. (6 references)

256

Persistence, Mobility, and Degradation of Carbon-14-Labeled-Dimethoate in Soils

Duff, W.G.; Menzer, R.E.; Dep. Entomol., Univ. Maryland, College Park, Md

Environ. Entomol. (EVETEX), 2(3), 309-18; 1973

DIMETHOATE; SOILS; MOVEMENT; DEGRADATION; INSECTICIDES; PERSISTENCE; DIMETHOXON; TRACER; CONVERSION; METABOLITES; LOAM; SILT; CLAY; SAND; WATER; CARBOXYLIC ACID; RADIOACTIVITY; DISTRIBUTION; LOAMY SAND; CLAY LOAM

Carbon 14-labeled dimethoate was converted to dimethoxon and 2 unknown metabolites in silty loam, loamy sand, and clay loam. Conversion of dimethoate to dimethoxon was faster in more moist soils, and the levels were generally greater. Dimethoate carboxylic acid was the only hydrolytic metabolite identified. The distribution of radioactivity appeared to be influenced by soil type. Downward movement was slightly more extensive in loamy sand. An increased soil moisture content promoted downward movement in all 3 soil types and a more rapid disappearance of carbon 14-dimethoate equivalents.

257
Atrazine Soil Organic Matter Interactions

Dunigan, E.P.; McIntosh, T.H.; Ariz. Agric. Exp. Stn, Tucson, Arizona

Weed Sci 19 (3). 1971 279-282; 1971

POLYSACCHARIDES; PROTEIN; NUCLEIC ACID; HUMIC ACID; LIGNIN; QUINIZARIN; WATER; EXTRACTION; HERBICIDES; ABSORPTION; SILT LOAM; LOAM; ATRAZINE; SOILS; ETHYL ETHER; ETHYL ALCOHOL; WATER; FAT; OILS; WAXES; ADSORPTION; POLYSACCHARIDES

The adsorption capacity of a silt loam for atrazine was determined after successive extraction with ethyl ether, ethyl alcohol and hot water. Ether- and alcohol-extractable components (fats, oils, waxes) had a negligible capacity to adsorb atrazine. Hot-water extractable materials (polysaccharides) had a small adsorptive capacity. Of the compounds chosen to be representative of some soil organic matter components, polysaccharides had low affinities for atrazine, a protein and a nucleic acid had intermediate affinities and humic acid, lignin and quinizarin had high affinities. Weak chemical bonds may contribute to retention of herbicides by organic matter.

258
Adsorption-Desorption and Movement of Picloram (4-Amino-3,5,6-Trichloropicolinic Acid) in Soils

Duseja, D.R.; Utah State Univ., Logan, Utah

Univ. Microfilms, Ann Arbor, Mich., Order No. 73-5622, Diss. Abstr. Int. B 1973, 33(9), 4071; 1973

PICLORAM; SOILS; ADSORPTION; DESORPTION; MOVEMENT; BATCH TECHNIQUE; SOIL COLUMNS; CATIONS; FREUNDLICH MODEL; PH; INORGANIC SALTS

Adsorption and desorption of picloram in soils were studied using both batch technique and soil columns. In batch studies the soils adsorbed 10.8 to 58.2% of the added picloram from 0.05-10.0 ppm aqueous picloram solutions. Adsorption was highly correlated with organic matter and sesquioxides content of the soils, and significantly correlated with cation exchange capacity. Equilibration time was 4-120 hours. An increase in the temperature from 17.7 degrees C to 25 degrees C caused increased adsorption; raising the temperature further decreased adsorption. Adsorption followed the Freundlich Model. Adsorption showed a close negative correlation with pH changes. From 41.0 to 71.8% of the initially adsorbed picloram could be eluted by two successive extractions with deionized water. Picloram in aqueous solution was not precipitated by addition of electrolytes. In soil divalent inorganic cations increased adsorption more effectively than monovalent cations. Studies on the effect of calcium chloride concentrations on picloram adsorption suggested an exchange type reaction with picloram acting as a cation. Column studies corroborated the findings of batch studies; inorganic salts did impede picloram movement in soils, presumably by increasing picloram adsorption.

259
Picloram 4 Amino-3,5,6-Trichloro Picolinic-Acid Persistence in Soil and Plant and Bioassay Methods of Residue Determination

Ettersten, S.

Institutionen for Vaxtodling, Lantbrukshogskolan: 750 07 Uppsala 7, Sweden, 173 p.; 1972

SOILS; PLANTS; PICLORAM; PERSISTENCE; BIOASSAY; RESIDUES

260
Fate of S,2 Methoxy-5-Oxo-Delta-3-1,3,4-Thiadiazolin-4-Yl Methyl-O O-Dimethyl Phosphorodithioate Supracide in Field Grown Agricultural Crops and Soil

Eberle, D.O.; Hormann, W.D.

J Ass Offic Anal Chem 54 (1) 1971 150-159

APPLES; CHERRY; GRAPES; PRUNE; POTATOES; HOP; INSECTICIDES; RESIDUES; CHOLIN; ESTERASE; INHIBITION; CHROMATOGRAPHY; AGRICULTURE

261
Insecticide Residues in Soils

Edwards, C.A.

Residue Reviews, 13, 83-132; 1966

RESIDUES; INSECTICIDES; VOLATILITY; SOLUBILITY; FORMULATION; SOILS; SOIL CONTENT; MINERALS; MICROORGANISMS; TEMPERATURE; RAINFALL; LEACHING; MOISTURE; CULTIVATION

262
Insecticides

Edwards, C.A.; Dep. Entomol., Rothamsted Exp. Stn., Harpenden/Hertfordshire, Engl.

Org. Chem. Soil Environ.(26DJAE) 1972, 2, 513-68; 1972

REVIEW; SOILS; INSECTICIDES

263
Movement of Dieldrin Through Soils. 1. From Arable Soils into Ponds

Edwards, C.A.; Thompson, A.R.; Benyon, K.I.; Rothamsted Exp. Stn., Harpenden, England

Pestic. Sci., 1, 169-173; 1970

DIELDRIN; SOILS; PONDS; WATER; BOTTOM MUD; MOVEMENT; AIR

Dieldrin at 22-45 kg/ha of active ingredient was applied to strips of soil near ponds. The strips were separated from the ponds by shallow to steep slopes. The dieldrin was lightly raked into the soil, thoroughly incorporated by a cultivator, or was not incorporated after application. Dieldrin was found in small amounts in untreated soil on the surface of the slopes between the treated strips and the ponds, but none was found in the pond water. Very small amounts (maximum 0.3 ppm) were found in the bottom mud of ponds, but not when the dieldrin was thoroughly incorporated into the soil. The largest amount of dieldrin in the soil below a depth of 15 cm was 1.1 ppm 81 weeks after application.

264
Movement of Chlorfenvinphos in Soil

Edwards, M.J.; Beynon, K.I.; Edwards, C.A.; Shell Research Ltd., Woodstock Agricultural Research Centre, Sittingbourne, Kent, UK

Pesticide Science, 2(1), 1-4; 1971

MOVEMENT; CHLORFENVINPHOS; SOILS; INSECTICIDES; TERRESTRIAL ECOSYSTEMS; PONDS; MUD; WATER; LEACHING; DIELDRIN

In 2 field experiments, the insecticide was applied to sloping arable land at 22 kg active ingredient/ha. Only very small quantities of the insecticide appeared lower down the slope and at the bottom and no detectable amounts reached the pond mud or the pond water (of one of the experiments) within 36 weeks of application. In trough experiments, most of the leaching of chlorfenvinphos occurred during the first 9 weeks after treatment and the amounts appearing in the leachates were about 9 times greater than in a similar experiment using dieldrin. More chlorfenvinphos leached vertically in drainage water than laterally over the surface.

265
Methoxychlor and 2,4,5-T in Lysimeter Percolation and Runoff Water

Edwards, W.M.; Glass, B.L.; North Appalachian Exp. Watershed, Coshocton, OH

Bull. envl. Contam. Toxicol., 6, 81-84; 1971

METHOXYCHLOR; SILT; LOAM; SANDSTONE; BEDROCK; PERCOLATION; ROOT ZONE; LYSIMETER; WATER; 2,4,5-T; RUNOFF

Runoff during the 14 months after application of 11.2 kg/ha of 2,4,5-T and 22.4 kg methoxychlor of a well-drained silt loam over sandstone bedrock removed 0.05% of the 2,4,5-T and 0.004% of the methoxychlor. Percolated water intercepted below the rooting zone at 2.44 m, contained no methoxychlor and only traces of 2,4,5-T.

266
Effect of Soil Types on the Performance of Some Total Growth Control Chemicals

Effer, W.R.

Proc. Northeast Weed Contr. Conf. 24, 257-263; 1970

GRASS; PICLORAM; DIURON; BROMACIL; ATRAZINE; PROMETONE; HERBICIDES; WEED CONTROL; SOILS

267
Lindane Diffusion in Soils. 2. Water Content, Bulk Density and Temperature Effects

Ehlers, W.; Farmer, W.J.; Spencer, W.F.; Letey, J.

Soil Sci. Soc. Amer. Proc., 33, 505-508; 1969

LINDANE; DIFFUSION; SOILS; WATER; BULK DENSITY; TEMPERATURE

268
Lindane Diffusion in Soils. 1. Theoretical Consideration and Mechanisms of Movement

Ehlers, W.; Letey, J.; Spencer, W.F.; Farmer, W.J.

Soil Sci. Soc. Amer. Proc., 33, 501-508; 1969

LINDANE; DIFFUSION; SOILS; MOVEMENT; THEORY

269
Fate of Cacodylic Acid in Soils and Plants

Ehman, P.J.; Wisconsin Alumni Research Foundation, Madison, Wisconsin

Ansul Chemical Company, Marinette, Wisconsin, 17 p.; 1963, December 26

AGRICULTURE; CACODYLIC ACID; SOILS; PLANTS; BEANS; CABBAGE; CORN; POTATOES; CARROTS; SOYBEANS; ANSAR-138; ADSORPTION; RESIDUES; RATS; ANIMALS; ARSENIC

Seven field crops, grown in a soil treated with 5 lb/acre of 100% cacodylic acid, showed no significant arsenic residue in the edible portions. Cacodylic acid, when applied to soils as a water solution, is quite firmly surface adsorbed by the soil particles. A small but steady leaching of cacodylic acid occurs in watered soils. Cacodylic acid applied to a sod surface becomes rather evenly distributed at a 10-inch depth in about one week. The smoke, from burning grass previously treated with cacodylic acid showed increased irritation to mucous membranes of the lungs of rats, over smoke from burning untreated grass. No other toxic effects resulting from smoke inhalation were noted.

270
Bromophos and Bromophos Ethyl Residues

Eichler, D.

Part of Gunther, F.A. (Ed.), Residue Reviews, Vol. 41, Heidelberg, West Germany, Springer-Verlag, New York, N.Y., (p. 65-112), 187 p.; 1972

INSECTICIDES; METABOLISM; PLANTS; RESIDUES; ANIMALS; BROMOPHOS; BROMOPHOS ETHYL

271
Degradation of Triforine in Selected Crops

Eichler, D.; C.H. Boehringer Sohn. Ingelheim

Meded. Fac. Landbouwwet. R.U. Gent., 37(2), 831-839; 1972

DEGRADATION; TRIFORINE; CROPS; FUNGICIDES; MAMMALS; DISEASE; CEREALS; FRUITS; VEGETABLES; ORNAMENTAL; RESIDUES; HYDROLYSIS; CHLORAL HYDRATE; GAS CHROMATOGRAPHY; APPLES; BARLEY CUCUMBERS; PUMPKINS; BREAKDOWN; STRAW; PLANTS; KERNELS

Triforine is a systemic fungicide with a low mammalian toxicity. It is suitable for the control of diseases on small cereals, fruits, vegetables, and ornamentals. A method of determining residues in crops is described. The extract is hydrolyzed in hot acid. Triforine is cleaved to chloral hydrate, which is determined by means of gas chromatography. The detection limit is below 0.01 ppm triforine. Degradation curves of triforine in barley plants, apples, cucumbers, and pumpkins are presented. The degradation in barley plants and apple foliage is much faster than in apple, cucumber, and pumpkin. Due to the fast breakdown in green plants of cereals there are only small amounts of triforine in the straw (0.01-0.2 ppm) and no detectable residues in the kernels at harvest time. After 7-10 applications the deposit on apples is not higher than 1-1.5 ppm. Cucumber and pumpkin have initial residues smaller than 1 ppm. These values decrease only slightly during the period following the last application. On the basis of 90 day feeding studies in animals residues of triforine of the reported magnitude can be considered as not harmful to man and animals.

272
Effect of Soil Solution and Organic Matter Sources on the Rate of Persistence of Certain Insecticides

El-Rafie, M.S.; Zidan, Z.H.A.

Bull Entomol Soc Egypt Econ Ser (5) 1971 (Recd 1972) 159-169

DISISTON; TEMIK; TRIOCRON; HEPTACHLOR; SOILS; PERSISTENCE; INSECTICIDES

273
Soil and Ground Water Pollution

Elrick, D.E.; MacDonald, K.B.

Pac. Sci. Congr. Proc. 1. 27: 1971

MICROBIOLOGY; DEGRADATION; PESTICIDES; TRANSPORT; MOVEMENT; WATER; GROUND WATER

274
Movement, Adsorption and Degradation of 2,4-Dichlorophenoxyacetic Acid in Soil

Elrick, D.E.; MacLean, A.H.

Nature, 212(5057), 102-104; 1966

MOVEMENT; ADSORPTION; DEGRADATION; ACIDS; SOILS; 2,4-D

275
Bio Degradation of 2,6-Dichlorophenoxy Acetic-Acid and Related Chlorophenols

End, C.S.; Dade, J.J.

Annu. Meet Am. Soc. Microbiol. 72, 7; 1972

MICROORGANISMS; 2,4-D; HERBICIDES; SOILS; SLUDGE; BIODEGRADATION; DEGRADATION; CHLOROPHENOXY; ACETIC ACID; CHLOROPHENOLS

276
Etiology and Chemo Therapy of Pythium Root Rot on Chrysanthemums-D

Engelhard, A.W.; Miller, H.N.; de Neve, R.T.

Plant Dis Rep 55 (10) 1971 851-855

SOIL-BORNE PATHOGENS; TRUBAN; DEXON; FUNGICIDES; ETIOLOGY; PYTHIUM; ROOT ROT; CHEMOTHERAPY

277
Degradation of Linuron and Some Other Herbicides and Fungicides by a Linuron Inducible Enzyme Obtained from BACILLUS-SPHAERICUS

Engelhardt, G.; Wallnofer, P.; Plapp, R.

Appl Microbiol 22 (3) 1971 284-288

ACYL AMIDASE; ACYL ANILIDE; PHENYL; UREA; DEGRADATION; LINURON; HERBICIDES; FUNGICIDES; ENZYME

278
Relative Leaching Potential Estimated from Hydrologic Soil Groups

England, C.B.

Part of Proceedings of the 8th American Water Resources Conference, St. Louis, 30 Oct.-2 Nov. 1972, p. 105 (Proc. Ser. No. 16); 1972, November

LANDFILL; LEACHING; SOILS; WATER; HYDROLOGY

279
Metabolism of Certain Selected Pesticides

Engst, R.; Zentralinst. Ernaehr., Dtsch. Akad. Wiss. Berlin, Potsdam-Rehbruecke, Ger.

Nahrung(NAHRAR) 1971, 15(8) 815-25; 1971

REVIEW; PESTICIDES; METABOLISM; DEGRADATION; RESIDUES; CHLORINATED HYDROCARBONS; ORGANOPHOSPHATES; PARATHION; DITHIOCARBAMATE; ETHYLENEBIS; PHTHALIMIDE CAPTAN; MAMMALS; MICROORGANISMS

A review with 32 references of the metabolic degradation of residuesof chlorinated hydrocarbon DDT, organophosphorus Parathion, dithiocarbamate Ethylenebis Dithiocarbamate, and phthalimide Captan pesticides in microorganisms and mammals.

280
Persistence of 5,6-Dichloro-2-Trifluoromethylbenzimidazole, a Major Degradation Product of Fenazaflor in Hagerstown Silt Loam Soil

Ercegovich, C.D.; Hartwig, N.L.; Witkonton, S.; Carroll, P.; Pennsylvania State University, University Park, Pa

Environ Entomol., 1(6), 730-734; 1972

POTATOES; CARROTS; ACARICIDES; CHROMATOGRAPHY; PERSISTENCE; DEGRADATION; FENAZAFLOR; SILT; LOAM; SOILS; NC 2983

Fenazaflor was applied in single and repeat doses to field plots in autumn and summer, and 5,6-dichloro-2-trifluoro-methylbenzimidazole (NC-2983) residues were determined by gas chromatography. No significant disappearance of NC-2983 occurred during autumn, winter or early spring, but it declined rapidly in summer. 80% of that applied in summer disappeared in 135 days, whereas 1 year was required for a comparative amount to disappear when applied in autumn. Residues were not found below the six-inch soil depth.

281
Effectiveness of Several Beet Herbicides in Relation to Soil Factors

Ernst, J.; Roth, R.; Maertin, B.; Inst. Acker-Pflanzenbau, Friedrich-Schiller-Univ., Jena, E. Ger.

Arch. Acker- Pflanzenbau Bodenk.(AAPBCE), 16(3), 225-33; 1972

SOILS; HERBICIDES; MAGNESIUM; BETANIL; MUSTARD; SUGAR BEETS; PLANTS; PROPHAM; PROXIMPHAM; DIURON; CLAY

The soil organic matter content had a decisive influence on the effect of herbicides on mustard and sugarbeet plants. Thus, 6 times the dose of Betanil Propham plus Proximpham plus Diuron was required to achieve the same herbicidal effect on mustard grown on soil containing 10.64% as opposed to 1.29% organic matter. The Magnesium content of soil was positively correlated with the organic matter content. A high clay content also negative affected herbicidal action.

282
A Simplified Method for Determining Phytotoxicity, Leaching and Adsorption of Herbicides in Soils

Eshel, Y.; Warren, G.F.

Weeds, 15, 115-118; 1967

PHYTOTOXICITY; LEACHING; ADSORPTION; HERBICIDES; SOILS

283
The Bio Degradation of Pesticides in the Soil

Esser, H.O.; J.R. Geigy S.A., Basle, Switzerland

Meded Fac Landouwwet Rijksuniv Gent 35 (2) 1970 753-783; 1970

DEGRADATION; PESTICIDES; REVIEW; SOILS

284
Herbicide Contamination of Surface Runoff Waters

Evans, J.O.; Duseja, D.R.; Utah State Univ., Logan, UT

Environmental Protection Technology Series; Monitoring Agency Rept. No. W73-12511, EPA-R2-73-266; Proj. EPA-13030-FDJ; 106p.; 1973, June

FLOW RATE; ATRAZINE; TRIAZINE; PICLORAM; PICOLINIC ACID; HERBICIDES; ACETIC ACIDS; TRICHLOROPHENOXY; WATER; SOILS; SURFACE WATER; IRRIGATION; EROSION; ADSORPTION; LEACHING; UREA; CHLORINE; AROMATIC COMPOUNDS; MOVEMENT; DITCHES; CANALS; WATERSHEDS; GRASS; WEEDS; DIURON; SUMMITOL; PHENOXYACETIC ACID; PYRIDINE

Field and laboratory studies of the movement of herbicides were conducted to determine their potential as contaminants in irrigation return flow. Special emphasis was given to the use of herbicides for vegetation control along ditches, canals and watersheds where high dosages are required to control the excessive growth of grasses and broadleaved weeds. The following herbicides have been studied: substituted urea (diuron), triazines (summitol and atrazine), phenoxyacetic acid (2,4-D and 2,4,5-T) and a substituted pyridine (picloram).

285
Rates and Products of Decomposition of 2,2-Dibromo-3-Nitrilopropionamide

Exner, J.H.; Burk, G.A.; Kyriacou, D.; Halogens Res. Lab., The Dow Co., Midland, MI 48640

J. Agr. Food Chem., 21(5), 838-842; 1973

DECOMPOSITION; DBNPA; ANTIMICROBIAL; INDUSTRY; INDUSTRIAL WATER TREATMENT; WATER; SEED DRESSINGS; HYDROLYSIS; POLAROGRAPHIC; PH; CARBON DIOXIDE; AMMONIUM; BROMIDE; ION; ACETONITRILE; OXALIC ACID; DIBROMOACETAMIDE; SOILS; DIBROMOACETIC ACID; GLYOXYLIC ACID; BISULFITE; CYANOACETAMIDE

Rates and products of decomposition of 2,2-dibromo-3-nitrilopropionamide (DBNPA), an antimicrobial compound used for industrial water treatment and as a seed dressing, were determined over a range of conditions. Rates of hydrolytic decomposition determined polarographically at various pHs and temperatures, are consistent with acid- and base-catalyzed amide hydrolysis. Hydrolysis of DBNPA ultimately forms carbon dioxide, ammonia, and bromide ions via the following sequence of degradation products: dibromoacetonitrile, dibromoacetamide, dibromoacetic acid, glyoxylic acid, and oxalic acid. DBNPA reacts rapidly with various ions such as bisulfite to form cyanoacetamide. Decomposition under the influence of sunlight also leads to cyanoacetamide. Contact with soil and soil organisms degrades DBNPA. Decomposition of DBNPA by several chemical and biological pathways ensures that the compound will not persist in the environment.

286
Aqueous Transport of Dieldrin Residues in Soils

Eye, J.D.

J. Water Pollut. Cont. Fed. Suppl., 40(8), 316-332; 1968

TRANSPORT; RESIDUES; DIELDRIN; SOILS; WATER

287
Adsorption of Herbicides in Soils

Farmer, W.J.; Department of Soils and Plant Nutrition, University of California, Riverside, CA

Part of Proceedings of the Annual California Weed Conference, (22), 80-82; 1970

VOLATILIZATION; ADSORPTION; HERBICIDES; SOILS

Factors affecting volatilization and adsorption of herbicides in soils are discussed.

288
Effect of Bulk Density on the Diffusion and Volatilization of Dieldrin from Soil

Farmer, W.J.; Igue, K.; Spencer, W.F.; Dep. Soil Sci. Agric. Eng., Univ. California, Riverside, Ca

J. Environ. Qual.(JEVQAA), 2(1), 107-9; 1973

DIELDRIN; SOILS; DIFFUSION; VOLATILIZATION; ORGANOCHLORINES; INSECTICIDES; DENSITY; SILT; LOAM; CLAY; ORGANIC MATTER; RATE; HUMUS; GILA SILT LOAM

As shown in laboratory experiments, using a gila silt loam, containing 0.58% organic matter and 17.6% clay, the rate of volatilization of dieldrin from a buried soil layer, increased as the bulk density of the overlying soil layer decreased. The rate of volatilization of dieldrin from a buried soil layer increased with time, reaching a maximum level when diffusion through the overlying soil layer neared a steady state. The volatility rate was proportional to the initial dieldrin concentration in the buried soil layer. The volatilization of dieldrin from treated soil seems to be controlled by diffusion, once the surface soil dieldrin concentration was reduced.

289
Volatility of Organochlorine Insecticides from Soil. 1. Effect of Concentration Temperature, Air Flow Rate, and Vapor Pressure

Farmer, W.J.; Igue, K.; Spencer, W.F.; Martin, J.P.

Soil Science Society of America, Proceedings, 30(3), 443-450; 1972, May-June

VOLATILIZATION; DIELDRIN; SILT LOAM; AIR FLOW; VAPOR PRESSURE; LINDANE; DDT; WATER MOVEMENT; RATE; INSECTICIDES; PESTICIDES; SOILS; AIR; SILT; LOAM; GILA SILT LOAM; WATER; MOVEMENT

The volatilization of dieldrin from Gila silt loam as influenced by soil pesticide concentration was determined in the laboratory at two air flow rates at 20 and 30 degrees C. The influence of pesticide vapor pressure on volatilization was measured by comparing the volatilization from Gila silt loam of dieldrin with that of lindane and DDT. No net water movement to or from the soil occurred during any of the volatilization processes. The vapor density of the soil-applied pesticide was the main factor controlling volatilization. The rate of volatilization of dieldirn from Gila silt loam increased with increasing soil pesticide concentration until the soil dieldrin concentration reached approximately 25 micro gram/g. This is the soil dieldrin concentration required to give a maximum saturation vapor density equivalent to that of the pure compound. An increase in temperature of 10 degrees C increased the rate of volatilization approximately fourfold. Increasing the rate of air movement over the soil surface from 0.005 to 0.018 mile/hour increased the rate of volatilization twofold. The order of rate of volatilization of three insecticides was: lindane greater than dieldrin greater than DDT. This is the same order for increasing vapor pressures of the three insecticides. The increase in rate of volatilization of the three insecticides was less than the increase in saturation vapor density of the pure compounds. This resulted because the concentrations of lindane and dieldrin in the soil rapidly decreased below that required to give a maximum vapor density of the pesticides. The maximum volatilization rates obtained represent potential losses of lindane, dieldrin, and DDT from soils of 202, 22, and 5 kg/ha/year, respectively. The volatilization rates decreased rapidly as soil pesticide concentration decreased. Extrapolation of the laboratory data to field situations suggests that the rate of volatilization could account for a significant proportion of these applied pesticides lost under normal field conditions.

290
Diffusion and Analysis of Carbon-14 Labeled Dieldrin in Soils

Farmer, W.J.; Jensen, C.R.

Soil Sci Soc Amer Proc., 34(1), 28-31; 1970

LIQUID SCINTILLATION; DIFFUSION; ANALYSIS; CARBON 14; DIELDRIN; SOILS; TRACER

291
DDT Residues in Soil and Roots of Apple Trees Following Repeated Spraying

Fateyeva, O.F.; Kazakh Research Institute of Plant Protection, USSR

Khimiya Sel'sko Khozyaistvo, 10(3), 195-198

DDT; SOILS; TREES; ROOTS; RESIDUES; FRUITS; APPLES

Residues were determined after two or three sprays of 1500 l/ha containing 7g DDT/l. Soil resdiues decreased by 52.4-63.2% in the first year and 20-36% in the following two to three years, with the greatest reduction in the soil surface. Resdiue levels in soil and roots were correlated. Although residues in fruits were negligible, seeds contained 5-60 mg DDT/kg.

292
Potential Environmental Chemical Hazards Part 3. Industrial and Miscellaneous Agents

Fishtein, L.; Flamm, W.G.

Sci. Total Environ., 1(2), 117-140; 1972, August

BIBLIOGRAPHY; BIOCONVERSION; CHLORINATED HYDROCARBONS; FOOD CHAINS; ORGANIC MATTER; HAZARDOUS CHEMICALS; HAZARDS; HERBICIDES; ORGANOMETALLICS; PESTICIDES; POLYMERS; INDUSTRY

Selected chemicals, polymer and plastic ingredients, rubber additives, brightening agents, etc., are cited. Their structure, mode of entry into the ecological system, and known biological and toxicological effect are detailed. (131 references)

293
The Effect of Some Herbicides on the Retention of Mobile Phosphorus Forms and Potassium in the Soil of the Ukraine Steppes

Fisyunov, A.V.; Vsesoyuznyl Nauchno-Issledovatel'skii Institut Kukuruzy, Ussr

Dokl Vses (Ordena Lenina) Akad S-Kh Nauk im V I Lenina (3) 1972 11-13

CORN; SOYBEAN; PEAVINE; CHICK-PEA; LENTIL; WINTER WHEAT; SIMAZINE; PROPAZINE; CHLORAZINE; ATRAZINE; SOILS; PHOSPHORUS; POTASSIUM; MOBILITY

In a 3-year experiment on ordinary heavy loamy chernozem, triazines did not affect the mobile-p content of the plowed layer. Any changes in the mobile-k content disappeared a year or two after application.

294
Heavy Metals in Perspective

Fleming, G.A.

Farm Food Res., 4(4), 91-93; 1973

HEAVY METALS; SPECIFIC GRAVITY; CADMIUM; CHROMIUM; COBALT; COPPER; IRON; LEAD; MANGANESE; MERCURY; MOLYBDENUM; URANIUM; ZINC; CALCIUM; MAGNESIUM; POTASSIUM; SODIUM; SOILS; PLANTS; HEALTH; DISEASE

Heavy metals all have one property in common, a specific gravity of at least 4. Examples include cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, uranium and zinc. Such metals as calcium, magnesium, potassium and sodium are not regarded as heavy metals. In recent times popular science articles tend to lay stress on the role of heavy metals in pollution and, while this topic is dealt with in this article, it seems desirable to paint a broader picture. Accordingly the occurrence of heavy metals in soils and plants is discussed together with some aspects of their role in health and disease.

295
Aquatic Sediments

Foess, G.W.

J. Water Pollut. Contr. Fed., 44(6), 1211-1218; 1972

REVIEW; AQUATIC SEDIMENTS; PESTICIDES; TEMPERATURE; PH; SALT; CONCENTRATION; WATER; UPTAKE; TOXAPHENE; SORPTION; ALGAL BLOOMS; AQUATIC ECOSYSTEMS; SEDIMENTS

A review of recent literature on aquatic sediments showed that the nature of the chemical and the sediment and the organic content of the sediment are determining factors in the fate of pesticides in the aquatic environment. Temperature, pH, salt concentration, or organic pollutant concentration in the water do not significantly affect pesticidal uptake and release. Toxaphene accumulated in sediment by direct soprtion and by codeposition with algal blooms and other particulates. Since laboratory experiments showed that the sorption of toxaphene was irreversible, sediment could not be expected to be a source of toxaphene in the water. (65 references)

296
Degradation of 2-Butanone by a Species of Arthrobacter

Forney, F.W.; Daumy, G.O.; Larson, A.D.

Bacteriol Proc. 71, 142; 1971

SOILS; ACETYL ESTERASE; GAS LIQUID CHROMATOGRAPHY; DEGRADATION; BUTANONE

297
Investigations on the Degradation and Vertical Movement of Pesticides in Soil

Foschi, S.; Cesari, A.; Ponti, I.; University of Bologna, Italy

Notiz. Mal. Piante 82-83, 37-49; 1970

MOVEMENT; ENDOSULFAN; THIODAN; CARBARYL; SEVIN; DDT; BENOMIL; ORGANOPHOSPHATES; PARATHION; ALDRIN; SOILS; DEGRADATION

Among the 14 chemicals investigated, the persistence of endosulfan (Thiodan) and carbaryl (Sevin) was slightly lower than that of the others (DDT, benomil, etc.), while the rate of degradation of organophosphates (such as parathion) was much more rapid. While aldrin was retained in the 0-40 cm layer of soil, small amounts of dieldrin or phorate occurred to depths of 60 cm.

298
Study of Degradation and Vertical Movement of Pesticides in the Soil

Foschi, S.; Cesari, A.; Ponti, I.; Bentivogli, P.G.; Bencivelli, A.

Notiz Mal Piante (82-83). 1970 37-49

DDT; DIELDRIN; TEMIK; CAPTAN; BENLATE; THIODAN; SEVIN; FUNGICIDES; INSECTICIDES; DEGRADATION; MOVEMENT; PESTICIDES; SOILS

299
Laboratory Incubation Studies of Chlorophenoxy Acetic Acids in Chernozemic Soils

Foster, R.K.; McKercher, R.B.; Dept. of Soil Seiena, University of Saskatchewan, Saskatoon, Canada

Soil Biol Biochem 5 (3). 1973 333-337

MICROORGANISMS; 2,4,5-T; 2,4-D; 2, 4-D; 2 METHYL-4 CHLOROPHENOXY ACETIC-ACID; HERBICIDES; HALF-LIFE; MOISTURE; DECOMPOSITION RATES; MCPA; SOILS; DEGRADATION; 2,4,5-T

MCPA, 2,4-D, and 2,4,5-T were degraded under laboratory conditions in six saskatchewan soils. The extent of degradation generally coincided with the size of the microbial popualtion. No degradation was observed in sterilized soil. In most of the soils degradation was most rapid with 50% moisture, and under field moisture conditions the half-life ranged from 14 to 51 days for 2,4-D and MCPA, and was about twice the length for 2,4,5-T. Comparative degradation rates of 1-Carbon 14 and 2-Carbon 14 labeled 2,4-D suggest that degradation was accomplished by ether cleavage rather than decarboxylation.

300
Action of Two Strains of Microorganisms Isolated from the Soil on Phenobenzuron and Their Effect on its Phyotoxicity

Fournier, J.C.; Soulas, G.; Catroux, G.; Lab. Microbiol. Sols, Inst. Natl. Rech. Agron., Dijon, Fr.

C. R. Acad. Sci., Ser. D(CHDDAT) 1973, 276(22) 2993-6; 1973

PHENOBENZURON; SOILS; BACTERIA; DIURON; UREA; HERBICIDES; PHYTOTOXICITY

301
Apparent Organochlorine Insecticide Contents of Soils Sampled in 1910

Frazier, B.E.; Chester, G.; Lee, B.G.

Pesticides Monit. J., 4(2), 67-70; 1970

ORGANOCHLORINE INSECTICIDES; GAS CHROMATOGRAPHY; DIETHYLENE GLYCOL; RESIDUES; INSECTICIDES; HEPTACHLOR EPOXIDE; ALDRIN; SOILS

A total of 34 soil samples taken in Wisconsin between 1909 and 1911 were extracted for organochlorine insecticides and analyzed by gas chromatography on three columns-a mixed QF-1/IV-17 column. The samples had been stored continuously since collection in tightly sealed glass jars and presumably were free of insecticide contamination. Of the 34 samples, 32 showed some apparent insecticide residues on at least one of the columns. Because peaks corresponding to particular organochlorine insecticides on chromatograms from one column did not recur on other columns, it was concluded that the peaks arose from coextracted indigenous soil components. Peaks corresponding to heptachlor epoxide on the QF-1/OV-17 column and to aldrin on the QF-1/ DC-200 column provided greatest interference in chromatographic determination. (5 references)

302
Adsorption, Movement, and Distribution of Pesticides in Soils

Freed, V.H.; Haque, R.; Dep. Agric. Chem., Oregon State Univ., Corvallis, Or

Pestic. Formulations(27IZAQ), 441-59; 1973

REVIEW; DISTRIBUTION; PESTICIDES; SOILS; ADSORPTION; MOVEMENT

303
Adsorption and Transport of Agricultural Chemicals in Watersheds

Frere, M.H.; Water Quality Management Lab., ARS, USDA, Durant, OK

Trans. ASAE (Amer. Soc. Agr. Eng.) 16(3), 569-572; 1973

MODEL; ADSORPTION; TRANSPORT; SOILS; WATER; PLANTS; AGRICULTURE; WATERSHEDS; DEGRADATION; VOLATILIZATION; MOVEMENT; FERTILIZERS; PESTICIDES; RUNOFF; PHOSPHATES; EROSION; STREAMS; TRANSPORT; HERBICIDES

A model describes the pathways of chemicals in the soil-water-plant system important to their movement in watersheds. Method of application, adsorption, degradation, and volatilization affect the pathway of the chemical, while hydrologic factors control the speed of movement and amount of chemical moved. Interactions involved have been illustrated in a hypothetical example.

304

Degradation of Chlorinated Hydrocarbons Under Anaerobic Conditions

Fries, G.F.; Anim. Sci. Res. Div., U.S. Dep. Agric., Beltsville, Md.

Advan. Chem. Ser.(ADCSAJ) 1972, 111(Fate of Org. Pestic.) 256-70; 1972

REVIEW; ORGANOCHLORINE INSECTICIDES; DEGRADATION; INSECTICIDES

A review with 38 references on the anaerobic degradation of organochlorine insecticides in the environment.

305

Residue of an Organoarsenic Pesticide for Controlling Rice Sheath Blight in Rice Plants and Soils in Treated Paddy Fields

Fujimoto, Y.; Kawahara, T.; Nakamura, H.; Agr. Chem. Insp. Sta., Min. Agr. and Forestry, Tokyo, Japan

Bull. Agr. Chem. Insp. Sta., 12, 71-75; 1972

RICE; PESTICIDES; SOILS; PLANTS; RICE SHEATH BLIGHT; ORGANOARSENIC; FUNGICIDES; FERRIC METHANE; ARSENATE; ARSENIC

Organoarsenic fungicides such as ferric methanearsotate are indispensable for controlling rice sheath blight, one of the major diseases of rice plants in Japan. The relationship between the amount of organoarsenicals applied and their residues in rice grain, straw, and soil was studied. The residues of total, inorganic, and organic As (as As2O3) were determined in polished and unpolished rice grain, straw, and soil to which ferric methanearsonate had been applied at rates of 5.2-16 g (as As2O3)/10 are in four districts. Total amount of As in the soil was unexpectedly high in all districts even in the fields where no arsenic had been applied (rates of 13.5, 55.0, 20.0, and 57.50 ppm). About 54-100% of total As was inorganic, the organic As percentage being very small. In rice grain harvested in paddy fields where the soil contained more than 20 ppm of organic As, unpolished rice grain contained 0.68-1.65 ppm total As and 0.05-0.62 ppm organic As. Total As of less than 1.0 ppm and organic As of less than 0.3 ppm were detected in unpolished rice grain harvested in fields where total As was 60 ppm and organic As very small.

306

Metabolism and Degradation of Carbamate Insecticides

Fukunaga, K.; Div. Agric. Chem., Natl. Inst. Agric. Sci., Tokyo, Japan

Pestic. Terminal Residues, Invited Pap. Int. Symp.(25RGay) 1971, 163-71; 1971

REVIEW; CARBAMATE; INSECTICIDES; METABOLISM; ANTICHOLINESTERASE; DEGRADATION

A review with 27 references the relations between chemical structure, biological activities, metabolism, and degradation of carbamate insecticides such as nitrophenyl nn-dimethylcarbamate are discussed.

307

On Herbicide Residues in Soil. 1. The Residual Amount of 2, 4, 5-T and Na-PCP in Forest Soil

Funazaki, Z.; Asanuma, N.; Otsuji, H.

Nippon Noson Igakkai Zasshi, 21(2), 304-350; 1972

2,4,5-T; SOILS; PERSISTENCE; NA-PCP; FORESTS; CABBAGE; RESIDUES; HERBICIDES

Residues of 2,4,5-T were determined in two soils 12 and 18 months after application of 2.4 and 3.2 kg/ha and 2.8-10.7 X 10(-3) ppm after 12 and 18 months respectively. The levels decreased with depth and time. The persistence of Na-PCP in paddy and cabbage field soils was also studied.

308

Enzyme System Involved in the Decomposition of Phenyl Mercuric Acetate by Mercury Resistant Pseudomonas

Furukawa, K.; Tonomura, K.

Agric Biol Chem., 35(4), 604-610; 1971

GLUCOSE; DEHYDROGENASE; NAD; OXIDO REDUCTASE; ARABINOSE; DEHYDROGENASE; DECOMPOSITION; PHENYL MERCURIC ACETATE; MERCURY

309

Persistence of Atrazine in Sterile and Nonsterile Soils with Various Moisture Contents

Fusi, P.; Franci, M.; Ist. Chim. Agrar. For., Univ. Firenze, Florence, Italy

Agrochimica(AGRCAX), 15(6), 557-63; 1971

ATRAZINE; RECOVERY; SOILS; MOISTURE; BACTERIA; CLAY; SAND; STERILIZATION; DEGRADATION; HERBICIDES

The recovery of atrazine from clay, sandy, and organic soils was higher from dry samples than from moist sample; recovery was intermediate from samples which were alternately wet and dry. Recovery was greater from sterilized than from nonsterilized soils, although the effect of sterilization was lower when samples were moist. Studies designed to seperate microbial and chemical degradation of herbicides become complicated by the difficulty in sterilizing soil without altering its colloidal chemical properties.

310
Beitraege zur oekologischen Chemie. 56. Photoreactions of Aldrin/Dieldrin-Metabolite Dihydrochlordene-1,3-discarboxylic Acid

Gaeb, S.; Klein, W.; Korte, F.; Inst. Oekol. Chem., Schloss Birlinghoven, Germany

Chemosphere, 2(3), 107-110; 1973

METABOLITES; ALDRIN; SOILS; PLANTS; DIELDRIN; MAMMALS; REACTION PRODUCTS; PHOTOHYDROGENATION; PHOTOISOMERIZATION; DECHLORINATION; DIHYDROCHLORDENE-1,3-DICARBOXYLIC ACID

After dihydrochlordene-1,3-dicarboxylic acid, known as the prinicpal metabolite of aldrin in soil and various plants and of dieldrin in mammals, was irradiated in solution or gaseous form, the reaction products were identified. Substantial amounts of cyclized and hydrogenated compounds were formed; photohydrogenation is a newly discovered reaction type for this class of compounds. When the dimethyl ester of the title compound in 0.5% n-hexane solution was irradiated at wavelengths below 300 nm, dechlorination products were obtained. One of these products was present in about 85% yield after 25 minutes of irradiation. Different products were obtained on irradiation of a 1% solution of the dimethyl ester in n-hexane. In addition to the familiar reactions of dechlorination at the chlorinated double bond and cyclization three new reaction types were found: photoisomerization; photohydrogenation of the double bond in the chlorinated five-membered ring; and introduction of a double bond into the non-chlorinated five-membered ring with simultaneous hydrogenation of the chlorinated double bond.

311
Non-Biological and Fungal Transformations of Fungicides

Garraway, J.L.; Wye Coll., Univ. London, Ashford/Kent, Engl.

Pestic. Sci.(PSSCBG) 1972, 3(4) 449-55; 1972

REVIEW; FUNGICIDES; BIOTRANSFORMATION; DEGRADATION; METABOLISM; FUNGUS; TRANSFORMATION

A review with 76 references was given on the behavior and interactions of fungicides, including a few aspects of the metabolism of fungitoxicants and related compounds by fungi.

312
Metabolism of 4-Chloro-2-Methylphenoxyacetate by a Soil Pseudomonad. Preliminary Evidence for the Metabolic Pathway

Gaunt, J.K.; Evans, W.C.; Dep. Biochem. Soil Sci., Univ. Coll. North Wales, Bangor, Wales

Biochem. J.(Bijoak) 1971, 122(4) 519-26; 1971

CHLOROMETHYL; HERBICIDES; METABOLISM; PSEUDOMONAS; SOILS; PATHWAYS; CARBON; 4-CHLORO-2-METHYLPHENOXYACETATE; METABOLITES

The herbicide 4-chloro-2-methylphenoxyacetate was utilized by a soil pseudomonad in liquid media as a sole carbon source. The intermediate metabolites of 4-chloro-2-methylphenoxyacetate isolated from the cultures, were identified as 5-chloro-o-cresol, 5-chloro-3-methylcatechol, and Gamma-carboxymethylene-Alpha-methyl-Delta Alpha Beta-butenolide. Therefore, the following metabolic pathway was proposed:
4-chloro-2-methylphenoxyacetate greater than
5-chloro-o-cresol greater than
5-chloro-3-methylcatechol greater than
Gamma-carboxymethylene-Alpha-methyl-Delta Alpha Beta-butenolide greater than
Alpha-hydroxy-Alpha-methylmuconate.

313
Metabolism of 4 Chloro-2-Methylphenoxy Acetate by a Soil Pseudomonad Ring Fission Lactonizing and Delactonizing Enzymes

Gaunt, J.K.; Evans, W.C.

Biochem J 122 (4). 1971 533-542

HERBICIDES; RING FUSION; OXYGENASE; LACTONIZATION; ENZYME; DEHYDROCHLORINATION; FISSION; METABOLISM; ACETATE; SOILS

314
Leaching of Some Soil Insecticides in 3 Egyptian Soils

Gawaad, A.A.A.; Ali, F.S.N.M.; Shazli, A.Y.

Bull Entomol Soc Egypt Econ Ser., (5), 23-26; 1971

LEACHING; INSECTICIDES; SOILS

315
Atrazine, Terbutryne, and Gs-14254 Adsorption, Desorption, and Solubility in Salt Solutions and Movement in Soil Materials

Gaynor, J.D.; Oregon State Univ., Corvallis, Oreg.

Thesis, Oregon State University, University Microfilms Order No 73-21, 305 (135 p.); 1973

ATRAZINE; SOILS; MOVEMENT; TERBUTRYN; GS 14254; ADSORPTION; DESORPTION; SOLUBILITY; PH; RUNOFF; CLAY; LEACHING; WATER; CLOQUATO SOIL; CARBON; TRANSPORT; LIME; SEDIMENTS; S-TRIAZINE; PHYTOTOXICITY; RAINFALL; CROPS; HERBICIDES

Adsorption-desorption experiments with herbicides on cloquato soil indicated that salt concentrations in the soil solution would not be high enough to reduce s-triazine solubility. Low salt concentrations would reduce GS-14254 and terbutryn adsorption, thus increasing phytotoxicity. GS-14254 and terbutryn adsorption always decreased when the soil pH increased upon addition of base whereas atrazine adsorption increased in some soils. Soils high in clay and carbon content greatly reduced the effect of pH on s-triazine adsorption. Atrazine adsorption occurred in the soil carbon fraction whereas GS-14254 and terbutryn showed equal affinity for organic and clay mineral surfaces. Atrazine and terbutryn losses in transported sediment and runoff water from herbicide treated areas are not great enough to create a threat to nontarget organisms or surrounding crops. Because of high adsorption, atrazine and terbutryn leaching in unlimed and limed soil was restricted to the top 23 cm of soilafter addition of 15 cm of rainfall.

316

Behavior of Urea Herbicides on Soil with Special Reference to Environmental Contamination Problems

Geissbuhler, H.; Guth, J.A.; CIBA Agrochem. Div., Basle, Switzerland

Part of Proc. 10th br. Weed Control Conf. 1970 (p. 307-313); 1970

PERSISTENCE; HERBICIDES; LEACHING; FLUOMETURON; SOILS

Under typical climatic conditions in Central Europe, the parent compound and total residue disappeared at a rate such that not more than 20% of the initial concentration persisted 5 months after application. None of the herbicide was leached below a depth of 30 cm. Fluometuron did not penetrate into drainage water.

317

The Fate of N'-(4-Chlorophenoxyphenly)-N, N-dimethylurea (c-1983) in Soils and Plants 1. Adsorption and Leaching in Different Soils

Geissbuhler, H.; Haselbach, C.; Aavi, H.

Weed Research, 3, 140-153; 1963

FATE; N'(4-CHLOROPHENOXYPHENYL)-N, N-DIMETHYLUREA; SOILS; PLANTS; ADSORPTION; LEACHING

318

Leaching as a Tool in the Evaluation of Herbicides

Gerber, H.R.; Ziegler, P.; Dubach, P.

Part of Proc. 10th br. Weed Control Conf., 1970, (118-125); 1970

LEACHING; HERBICIDES; SOILS; BIOASSAY

Leaching of commercial herbicides and experimental products was determined chromatographically, using thick layers of soil and bioassay to detect the herbicides.

319

Persistence of Methidathion in Soils

Getzin, L.W.; Wash. St. Univ., Puyallup, WA

Bull. Env. Contam. Toxicol., 5, 104-110; 1970

METHIDATHION; PERSISTENCE; SOILS; DEGRADATION; SILT; SAND; CLAY; ORGANIC SOILS; LOAM; MICROORGANISMS; TRACER

Methidathion degraded rapidly in a sandy loam, silt loam, clay loam and organic soil. Fifty per cent of the initial applications decomposed in less than 2 weeks and greater than 90% disappeared within 16 weeks. In soils treated with methidathion containing $^{14}CO_2$ in the ring or methyl side chain, 40-66% of the radioactivity was recovered as $^{14}CO_2$ after 16 weeks. Over half of the remaining radioactivity could not be extracted from the soils, while less amounts were recovered as the parent compound or as water-soluble degradation products. In fumigated soils, 50% of the initial insecticide applications still remained after 16 weeks and less than 3% of the radioactivity was expired as $^{14}CO_2$. This suggests that microorganisms are primarily responsible for the degradation of methidathion in soil.

320

Persistence and Degradation of Carbofuran in Soil

Getzin, L.W.; Western Washington Res. Extension Center, Washington State University, Puyallup, Wa 98371

Environ Entomol., 2(3), 461-467; 1973

CARBON 14; BENZOFURAN; INSECTICIDES; MICROBIAL ACTIVITY; SOILS; STERILIZATION; PH; HYDROLYSIS; TRACER; PERSISTENCE; PESTICIDES; HYDROLYSIS; CARBOFURAN; SILT LOAM; PHENOL

Laboratory studies indicated that rapid chemical hydrolysis is responsible for the degradation of carbofuran in alkaline soils although some chemical and microbial degradation occurs in acid soils. Half-lives varied from 4 to greater than 54 weeks, depending on soil type. Sterilization had no effect on the degradation rate of carbofuran in ritzville silt loam and only a slight effect in the sultan and organic soils tested. Most of the Carbon 14 was recovered from the degraded carbonyl-labeled carbonfuran as $^{14}CO_2$. The amount of bound radioactivity increased to levels as high as 71% of the applied radioactivity and then gradually decreased. Carbofuran phenol yielded similar results. Carbonfuran is probably hydrolyzed to the phenol, immediately bound to the soil constituents, and slowly metabolized by microorganisms.

321

Effect of Soils Upon the Uptake of Systemic Insecticides by Plants

Getzin, L.W.; Chapman, R.K.; Department of Entomology, University of Wisconsin, Madison, WI

Journal of Economic Entomology, 52(6), 1160-1165; 1959

DIMETHYL 5-(1-ISOPROPYL-3-METHYL-PYRAZOLYL-CARBAMATE); 1-METHOXYCARBONYL-1-PROPEN-2-YL DIMETHYL PHOSPHATE; ORGANIC MATTER; NITROGEN ORGANIC SYSTEMIC INSECTICIDES; LEACHING; APHIDS; BIOASSAY; ANTICHLOINESTERASE THIMET; SOILS; SAND; O,O-DIETHYL S-(ETHYLTHIO)METHYL PHOSPHORODITHIOATE; SCHRADAN; ISOLAN; BINDING; EXCHANGE CAPACITY; PHOSDRIN; INSECTICIDES

322

Partial Purification and Properties of a Soil Enzyme That Degrades the Insecticide Malathion

Getzin, L.W.; Rosefield, I.

Biochim Biophys Acta., 235(3), 442-453; 1971

PURIFICATION; SOILS; ENZYME; INSECTICIDES; MALATHION; ESTERASE; ION EXCHANGE; CHROMATOGRAPHY; DEGRADATION

323
Persistence of Diazinon and Zinophos in Soils

Getzin, L.W.; Rosefield, I.

J. Econ. Entom., 59(3), 512-516; 1966

PERSISTENCE; DIAZINON; ZINOPHOS; SOILS

324
The Behaviour of Weedkillers in Soil (Biological Decomposition, Activity and Persistence)

Giardini, L.; Universita di Padova, Italy

Rivista di Agronomia, 4(1-2), 73-81; 1970

REVIEW; MCPA; 2,4-D; MONURON; PARAQUAT; WEEDKILLERS; HERBICIDES; ATRAZINE; SIMAZINE; FENURON; SOILS; PERSISTENCE; DECOMPOSITION

A review, with 57 references. Bacteria, actinomycetes and fungi capable of decomposing various weedkillers (MCPA, 2,4-D, Monuron, Paraquat etc.) are listed, and weedkillers (atrazine, simazine, fenuron, etc.) are classified according to their persistence in soil.

325
The Behaviour of Weedkillers in Soil (Chemical and Physical Aspects)

Giardini, L.; Universita di Padova, Italy

Rivista di Agronomia, 3(4), 161-173; 1969

MCPA; 2,4-D; CLAY; ILLITE; KAOLINITE; MONTMORILLONITE; MOBILITY; WEEDKILLERS; SOILS; ADSORPTION; HERBICIDES; REVIEW

A review, with 57 references. Tabular data are presented on the adsorption of weedkillers (such as MCPA, 2,4-D) by clay minerals (illite, kaolinite, montmorillonite) and on the mobility of weedkillers in clayey or sandy soils.

326
S Triazine Adsorption Studies Calcium Hydrogen Humic-Acid

Gilmour, J.T.; Coleman, N.T.; University of Wisconsin, Madison, Wi

Soil Sci Soc Amer Proc 35 (2). 1971 256-259.

ATRATONE; ATRAZINE; PROMETONE; PROMETRYNE; HERBICIDES; ION EXCHANGE; ADSORPTION; HUMIC ACID; CALCIUM; S-TRIAZINE

When small amounts of ca-h-humic acid suspension in dialysis bags were immersed in dilute CaC12 solution containing 1.33 x 1e-5m to 6.67 x 1e-5m atratone, atrazine, prometone or prometryne, the adsorption isotherms were linear. An increase in the CaC12 concentration from 1e-4m to 1e-2m or in Ca saturation of humic acid decreased s-triazine adsorption. Adsorption increased when the amount of Ca humate at a specified Ca saturation was increased.

327
Effect of Ammonium Ortho Phosphate and Pyro Phosphate on Zinc and Phosphorus in Soil Solution

Giordano, P.M.; Sample, E.C.; Mortvedt, J.J.

Soil Sci 111 (2). 1971 101-106.

FERTILIZERS; ORGANIC MATTER; SOLUBILITY; HYDROLYSIS; AMMONIUM; PHOSPHATES; PYRO PHOSPHATE; ZINC; PHOSPHORUS; SOILS; ORTHPHOSPHATE

328
Effect of Herbicide Preparations on the Development of Soil Microflora in Cinnamon-Alluvial-Skeletal Soils of the Abkhaz Assr

Goguadze, V.D.; Gogiya, L.N.; USSR

Subtrop. Kul'T.(Sukua8) 1971, (4) 161-7; 1971

HERBICIDES; SOILS; MICROFLORA; PROMETRYNE; COTORAN; ISOCIL

When applied to the abkhaz soils, Prometryne (5-7 kg/ha), Cotoran (8-10 kg/ha), and Isocil (3-5 kg/ha) had little effect on soil actinomycetes, cellulose-degrading microflora, and penicillium and trichoderma fungi. In some cases the growth of microflora in the first 5 cm of soil was stimulated by the herbicides whereas the growth of some microflora 5-15 cm below the surface was inhibited.

329
Golab, T.; Herberg, R.J.; Gramlich, J.V.; Greenfield Lab., Eli Lilly and Co., Indiana

J. Agric. Food Chem., 18, 838-844; 1970

BENEFIN; DECOMPOSITION; PEANUTS; AEROBIC; LUCERNE; ABSORPTION; PLANTS; ROOTS; STEMS; HULLS; ANAEROBIC; ARTIFICIAL RUMEN FLUID; RUMINANT ANIMALS; SOILS

Under anaerobic conditions (soil flooded with water) benefin decomposed rapidly, only 4.6% of the originally incorporated amount being detectable after 16 days. Under aerobic conditions 50% was still detectable after 120 days, and 12.1% after 352 days. Growing peanuts and lucerne did not readily absorb soil-incorporated Carbon 14-labelled benefin. Most of the absorbed radioactivity was not extractable; however the extractable identifiable products were similar to those found in soil but only in trace concentrations. Highest concentrations were found in roots, followed by stems and hulls.

330
Terminal Residues of Endosulfan

Gorbach, S.; Farbwerke Hoechst A.-G., Frankfurt/Main, Ger.

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24May) 1972, 6,() 283-5; 1972

REVIEW; ENDOSULFAN; INSECTICIDES; METABOLISM

331
Residue Analyses and Biotests in Rice Fields of East Java Treated with Thiodan

Gorbach, S.; Haaring, R.; Knauf, W.; Farbwerke Hoechst A.G., Frankfurt, German Federal Republic

Bull. Env. Contam. Toxicol., 6, 193-199; 1971

RESIDUES; ENDOSULFAN; THIODAN; RICE; PADDIES; MUD; SOILS; PERSISTENCE

Residues of endosulfan (the active ingredient of Thiodan 35EC which was applied at 1.4 l/ha) declined within 3-5 days to a constant level in the rice paddy water of 0.0005-0.0008 ppm. In both the dry and wet mud of the paddies the residual level of endosulfan did not exceed 1.9 ppm.

332
Fumigants, Fungicides, and Nematocides

Goring, C.A.; Ag-Org. Dep., Dow Chem. Co., Walnut Creek, Calif.

Org. Chem. Soil Environ.(26DJAE_, 2, 569-632; 1972

REVIEW; SOILS; PESTICIDES; FUMIGANTS; FUNGICIDES; NEMATOCIDES

333
Physical Soil Factors and Soil Fumigant Action

Goring, C.A.

Part of Toussoun, T.A., Bega, R.V.; Nelson, P.E., (Eds.) Root Diseases and Soil-Borne Pathogens. Symposium. University of California Press; Berkeley, CA, 1970 (p. 229-233) 252p.

334
The Degradation and Movement of Picloram in Soil and Water

Goring, C.A.; Hamaker, J.W.; Dow Chemical Company, Walnut Creek, California

Down to Earth, 27(1), 12-15; 1971

DEGRADATION; MOVEMENT; SOILS; WATER; PICLORAM; REVIEW

335
Bioindicator Determination of the Adsorption of Herbicides by Three Types of Soils

Gorzelak, A.; Zakl. Gleboznawstwa Nawozenia, Inst. Bad. Lesn., Warsaw, Pol.

Pr. Nauk. Inst. Technol. Org. Tworzyw Sztucznych Politech. Wroclaw.(PNITAP) 1972, No. 9,() 85-7; 1972

HERBICIDES; ABSORPTION; SOILS; ATRAZINE; SIMAZINE; DOMATOL; CLAY; MARSH; SANDY CLAY SOILS

Atrazine, simazine, and domatol were best absorbed by marsh soil, to a smaller extent by fine grain soil, and the least by light sandy clay soil.

336
Simultaneous Extraction of Hydroxyatrazine, Atrazine and Ametryne From Some Hawaiian Soils

Goswami, K.P.; Green, R.E.

Soil Sci Soc am Proc., 37(5), 702-707; 1973

TRIAZINE; HERBICIDES; EXTRACTION; AMETRYNE; SOILS; HYDROXYATRAZINE; ATRAZINE

337
Microbial Degradation of the Herbicide Atrazine and its 2 Hydroxy Analog in Submerged Soils

Goswami, K.P.; Green, R.E.; Univeristy of Hawaii, Honolulu, Hi

Environ Sci Technol., 5(5), 426-429; 1971

CHROMATOGRAPHY; PH; DETOXIFICATION; RESTRICTED AERATION; SOILS; HERBICIDES; ATRAZINE; DEGRADATION; MICROBES; HYDROXYATRAZINE; METABOLITE

Soil-applied pesticides transported by erosion from the site of application to waters and sediments are subject to conditions sufficiently different from those of aerated soils to alter persistence. Degradation was followed by measurement of carbon 14O2 evolution and chromatographic separation of metabolites in soil extracts treated with carbon 14 ring-labelled atrazine and hydroxyatrizine.

338
Waste Pesticide Management

Goulding, R.L.

Oreg. State Univ. Environ. Health Sci. Cen., 227-225; 1972

BIODEGRADATION; INDUSTRIAL WASTES; 2,4-D; HERBICIDES; MOVEMENT; VOLATILIZATION; WINDBORNE; DEGRADATION; GROUND WATER; SOILS; WATER

Nearly complete biodegradation of industrial wastes derived from production of 2,4-D and other herbicides has been achieved in tha Alkali Lake area of Oregon, in small plot applications after two years. Uncontrolled movement was a minimal hazard in this basin, and loss through volatilization or windborne particles was low. Losses have been reduced by subsurface soil injection, and degradation rates appear to be nearly as rapid as those found with surface application. Experiments in progress also indicate that the waste material could be used to eliminate undesirable range plants. In another phase of the project, site management criteria for classification and storage of spent containers, and monitoring of air and ground water, have been developed and are being used. Presently being tested is a decontamination process line.

339
Biological Activity of some Herbicides on Various Types of Soils with Various Moisture Contents

Grabowski, K.; Inst. Ochr. Rosl., Poznan, Pol.

Biul. Inst. Ochr. Rosl(BOCRA2), No. 48, 51-60; 1971

HERBICIDES; SOILS; WATER; BULPUR; MUSTARD; PREVENOL; NEXOVAL; ALIPUR; WHITE MUSTARD; BLACK EARTH; PODZOL

Bulpur, prevenol 56, nexoval, and alipur were 98, 84, 83, and 73% effective, respectively, against white mustard, SINAPIS ALBA. The herbicidal activity was greatest on black earth. No relation between moisture content and activity was observed on black earth and heavy podzols, but on light podzols, the herbicidal activity increased with increase in water content.

340
Diffusion of Organophosphorus Insecticides in Soils

Graham-Bryce, I.J.

J. Sci. Food Agr., 20(8), 489-494; 1965

DIFFUSION; DISULFOTON; DIMETHOATE; SILT LOAM; GAS LIQUID CHROMATOGRAPHY; INSECTICIDES; PESTICIDES; SOILS

Diffusion of disulfoton and dimethoate in a silt loam soil was studied over a range of concentrations and moisture contents. Apparent diffusion coefficients were calculated from the distribution of the insecticide in a column of soil after diffusion from one half of the column to the other for a known time. The distribution was determined by slicing the column into narrow sections using a specially constructed diffusion cylinder which is illustrated. Analysis was by gas-liquid chromatography with thermionic phosphorus detector. Diffusion coefficients varied little with concentration for both insecticides, but increased rapidly with increasing moisture content for dimethoate from 0.0000000331 SQ cm/sec at 10% volumetric moisture content to 0.00000141 SQ cm/sec at 43% moisture content. Conversely, for disulfoton, which is more volatile, less soluble and more strongly sorbed than dimethoate, diffusion coefficients were smaller (0.0000000283 SQ cm/sec at 41% moisture content and did not change much as the soil became drier (0.0000000274 SQ cm/sec at 8% moisture content)). The influence of partition between solid, solution and vapor phases in the soil and the influence of the geometry of the pathway through the soil pores on the apparent diffusion coefficient is discussed. The likely behavior of other pesticides is considered in the light of these results.

341
Solutions to Problems of Soil Pollution by Agricultural Chemicals

Graham-Bryce, I.J.; Rothamsted Exp. Sta., Harpenden, Herts., England

Part of Barrekette, E.S. (Ed.), Pollution: Engineering and Scientific Solutions, Plenum Press, New York-London (p. 133-147); 1973

SOILS; AGRICULTURAL CHEMICALS; HERBICIDES; ORGANOCHLORINES; METALS; FERTILIZERS; DEGRADATION; SOILS; DECONTAMINATION; ADSORBENTS

The problem of soil pollution by agricultural chemicals primarily involves persistent chemicals like the organochlorines and heavy metals, but some herbicides and fertilizers can also contribute. In general, chemicals are more readily evaporated and photochemically degraded when they are on the soil surface than when incorporated into the soil. Cultivation as a means of decontamination should be limited to soils with incorporated chemical. Addition of adsorbents such as activated carbon may have some occasional usefulness when large quantities of herbicide are required for non-recurrent control of a resistant weed. Increasing general microbial activity by the addition of sugars or various composts or by raising the temperature or maintaining a moist condition is one of the best ways to accelerate biological degradation. Replacement of persistent chemicals by alternative methods of pest control or by less persistent, more specific chemicals is frequently a better approach than employing the above mentioned methods for decontamination of the soil. Care must be exercised, however, in the introduction of biological controls as well. More efficient use of pesticides can be accomplished by application only to the target site, use of granular rather than emulsion formulations, microencapsulation, and exploitation of insect behavior. (45 references)

342
Research on and Determination of Chlorinated Insecticide Residues in Subsoil Waters. Preliminary Note

Grasso, C.

Boll. Soc. Ital. Biol. Sper., 44(20), 1701-1702; 1968

CHLORINATED INSECTICIDES; RESIDUES; SUBSOILS; WATER; SOIL; WATERS; SOILS; INSECTICIDES

343
Behavior and Persistence of Thiocarbamate Herbicides in Soils Under Different Environmental Conditions

Gray, R.A.; Weierich, A.J.

Part of Bawden, F. (President, Proceedings of the 9th British Weed Control Conference. Nov. 18-21, 1968, Birghton, England, Symposium, Vol. 1, 2, 3 (p. 94-101) 1368 p.; 1968

CYCLOATE; PEBULATE; DIPROPYL; THIOCARBAMATE; TEMPERATURE; MOISTURE; LEACHING; MICROORGANISMS; PERSISTENCE; HERBICIDES; SOILS

344
Leaching of Five Thiocarbamate Herbicides in Soils

Gray, R.A.; Weierich, A.J.

Weed Sci., 16, 77-79; 1968

LEACHING; THIOCARBAMATE; HERBICIDES; SOILS

345

Continuous Flow Method for Studying Adsorption of Organic Chemicals by a Humic Acid Preparation

Grice, R.E.; Hayes, M.H.; Lundie, P.R.; Cardew, M.H.; Dep. Chem., Univ. Birm., Birmingham, Engl.

Chem. Ind. (London), (5), 233-234; 1973

PESTICIDES; SOILS; ADSORPTION; HERBICIDES; HUMUS;; CONTINUOUS FLOW

346

Insecticidal Activity of Diethyl and Dimethyl Analogs of Azinphos, Bromophos, Carbophenothion, and Parathion on Glass Surfaces and in Soil

Griffiths, D.C.; Smith, C.; Rothamsted Exp. Stn., Harpenden/Herts., England

Pestic, Sci. (PSSCBG) 1973, 4(3), 335-42; 1973

DIMETHYL; DIETHYL; INSECTICIDES; GLASS; PARATHION; BROMOPHOS; CARBOPHENOTHION; AZINPHOS; BIOASSAY; SAND; PEAT; CLAY LOAM; LOAM; SOILS

The dimethyl and diethyl forms of parathion, bromophos, carbophenothion, and azinphos, for example dimethyl parathion, diethyl parathion, etc., were tested for their insecticidal activity on glass and in different types of soil. The 8 compounds were tested in a bioassay using DROSOPHILA MELANOGASTER. Generally, both forms of bromophos and parathion were more toxic on glass and in soil than the corresponding forms of carbophenothion and azinphos. There were only slight differences, however, between the toxicity of the diethyl and dimethyl forms of each insecticide. Insecticide toxicity in decreasing order in different soil types with different moisture contents was: moist sand equivalent to dry sand greater than moist clay loam greater than dry clay loam greater than dry peat greater than moist peat. In both sterile and non-sterile soil, the diethyl form remained toxic longer in the soil than the dimethyl form, except in the case of carbophenothion.

347

Microbiological Degradation of Parathion

Griffiths, D.C.; Walker, N.; Rothamsted Exp. Stn, Harpenden, England

Meded Fac Landouwwet Rijksuniv Gent., 35(2), 805-810; 1970

INSECTICIDES; PSEUDOMONADS; DEGRADATION; PARATHION; PERCOLATION; MICROBES; SOILS

Soil-percolation experiments showed that parathion in soil was decomposed by a heat-labile agent, transferable in small amounts from one soil culture to another. This is consistent with the effects of micro-organisms, but the organisms resposible have not yet been isolated in pure culture. Microrespirometer experiments showed that soil pseudomonads that grew with 4-nitrophenol as their sole source of Carbon did not metabolize parathion.

348

The Distribution of Carbon-14 Labelled Simazine and Atrazine Before and After Incubation Detected by Auto Radiography of Soil Particles

Grossbard, E.; Weed Research Organization, Begbroke Hill, Yarnton, Oxford, England

Meded Fac Landouwwet Rijksuniv Gent., 35(2), 531-542; 1970

HERBICIDES; DEGRADATION; SIMAZINE; ATRAZINE; SOILS; FUNGI; AUTORADIOGRAPHY; METABOLITES; MOBILITY; LEACHING; TRACER; CARBON 14; UPTAKE; FAECAL PELLETS; ANIMALS; ANIMAL CYSTS; MOVEMENT; RESIDUES; PLANTS

As a prelude to studies on the uptake and utilization of simazine and atrazine by fungi in soil, the incorporation of carbon 14 from labelled simazine into cell material by pure cultures of ASPERGILLUS FUMIGATUS and TRICHODERMA VIRIDE was demonstrated by high resolution autoradiography. Labelled structures of unidentified fungi were also detected in soil treated with carbon 14 labelled simazine. Redistribution of carbon 14-simazine and atrazine applied to the soil surface was investigated by a sensitiive autoradiographic technique with smears of soil particles. Radioactivity, initially confined to the surface layers, was detected at greater depths after incubation at 25 degrees and accumulated in plant residues, fungal resting structures, faecal pellets and animal cysts. It is suggested that the migration of activity was due to the formation of metabolites of greater mobility combined with leaching of residual intact herbicide. It is uncertain whether sites of perferential adsorption reatined the intact herbicide or carbon 14 atoms derived from degradation of the former.

349

Adsorptive Behavior of Acid and Ester Forms of 2,4-D on Soils

Grover, R.; Res. Stn., Canada Dep. Agric., Regina, Saskatchewan, Canada

Weed Res.(WEREAT) 1973, 13(1) 51-8; 1973

DICHLOROPHENOXYACETATE; ESTERS; ADSORPTION; SOILS; HERBICIDES; ACIDS; POTASSIUM; HUMUS; CLAY; HYDROLYSIS; WATER; 2,4-D; PRAIRIE SOILS; AQUATIC ECOSYSTEMS

The adsorption of 2,4-D, 2,4-D n-butyl ester, and 2,4-D isooctyl ester was studied on several Canadian prairie soils. The k values for 2,4-D ranged from 0.09-1.30 and were correlated to the soil organic matter but not to the clay content. The k values for the 2 esters could not be determined using slurry type adsorption experiments, since they both were hydrolyzed to 2,4-D in the aquatic medium. The q value (micrograms adsorbed /g organic matter) for 2,4-D was 7.2 the adsorptive behavior of 2,4-D esters in the soil are apparently similar to that of 2,4-D.

350

Movement of Picloram in Soil Columns

Grover, R.; Res. Stn., Agric. Dep. Canada, Regina, Saskatchewan, Canada

Can. J. Soil Sci.(CJSSAR), 53(3), 307-14; 1973

PICLORAM; MOVEMENT; PRAIRIE SOILS; HERBICIDES; SOILS; LEACHING; HUMUS; CLAY; BLACK SOIL; WATER; SANDY LOAM; LOAM; RATE; SOIL COLUMNS

Picloram was readily leached in all of 7 Canadian prairie soils tested. Picloram movement was greatest in the soil with the lowest organic matter and clay content. Picloram movement was the least in black soils which were high in organic matter. Picloram movement in clay soil was increased by increasing the water intensity increments from 0.25 to 2.5 cm, but this had no effect on picloram measurement in sandy loam. There was no significant difference in picloram movement at application rates of 0.2 or 2.0 kg/ha.

351

Adsorption of Picloram by Soil Colloids and Various Other Adsorbents

Grover, R.; Canada Department of Agriculture, Regina, Saskatchewan, Canada

Weed Sci 19 (4). 1971 417-418

STRAW; PEAT; MOSS; HERBICIDES; MONTMORILLONITE; CATION EXCHANGE RESIN; CELLULOSE POWDER; KAOLINITE; CLAY; PICLORAM; SOILS; ADSORPTION; ADSORBENTS

The kd values (microgram adsorbed/g divided by microgram/ml in equilibrium solution) for soils ranged from 0.09 to 0.75 and were correlated only with soil organic matter. The kd values for other adsorbents varied from 0 to 232, the order of adsorption being activated charcoal more than anion-exchange resin more than peat moss more than cellulose triacetate. No poclcram was adsorbed on montmorillonite or kaolinite clays, cation-exchange resin, wheat straw or cellulose powder. The differences in the adsorption of picloram were attributed to the relative affinities of the various adsorptive surfaces for the molecular or the ionized forms of the acid.

352

Extraction of 3 Amino-1, 2, 4 Triazole (Amitrole) and 2, 6-Dichloro-4-nitro Aniline from Soils

Groves, K.; Chough, K.S.; Agricultureal Chemistry Department, Washington State University, Pullman, Wa

J Agric Food Chem 19 (5). 1971 840-841

DCNA; SOILS; AMITROLE; EXTRACTION; TRIAZOLE; HEXANE

The recoveries of amitorle from non-sterile soil 1 and 17 days after application were 36.7 and 3.2% and 96.6 and 15.2% with water and a NH4OH-glycol (5+20) mixture, respectively. Corresponding figures for sterile soil were 49.6 and 36.9% and 97.3 and 67.7%. A in HCL-acetone-glycol (1 plus 1 plus 8) mixutre was much better than hexane for the extraction of DCNA from soils.

353

Fate of the Fungicide, 2,6-Dichloro-4-Nitroaniline (Dcna) in Plants and Soils

Groves, K.; Chough, K.S.; Dep. Agric. Chem., Washington State Univ., Pullman, Wash.

J. Agr. Food Chem.(JAFCAU) 1970, 18(6) 1127-8; 1970

DICHLORONITROANILINES; METABOLISM; PLANTS; SOILS; NITROANILINES; FUNGICIDAL DICHLORODINITROANILINES; DCNA; SUGARS; BEANS; ROOTS; TRANSFORMATION; INCUBATION; RATE; DECOMPOSITION; BACTERIA

The fungicide, 2,6-dichloro-4-nitroaniline (DCNA) (I) was absorbed by bean plant roots and transformed into natural plant constituents (sugars and amino acids). After incubation of soils with DCNA, the rate of decomposition of DCNA in the soils into carbon dioxide and other products increased. Pure cultures of rod-shaped bacteria that decomposed DCNA were isolated from the soils.

354

Residue Problems in the Use of Phosphoric Acid Ester Insecticides in Mushroom Cultures

Gruetner, P.; Rat Landwirtschaft. Prod. Nahrungsgueterwirtsch., Dresden, E. Ger.

Nachrichtenbl. Pflanzenschutzdienst Ddr(NPDDA2), 26(12), 245-7; 1972

MUSHROOM; INSECTICIDES; RESIDUES; DICHLORVOS; TINOX; BI58EC; ESTERS

355

Pollution Caused by Agriculture

Gudding, R.

Nor Veterinaertidsskr 84 (7-8). 1972 430-436

AIR; SOILS; WATER; WASTES; BIOCIDES

356

Volatilization of Lindane and DDT from Soils

Guenzi, W.D.; Beard, W.E.; U.S. Dept. Agric., Ft. Collins, Colo.

Proc. Soil Sci. Soc. Am., 34, 443-447; 1970

VOLATILIZATION; LINDANE; DDT; SOILS; DDE; LOAM; SAND; CLAY; PESTICIDES; INSECTICIDES; SOIL MOISTURE; DEGRADATION; GAMMA-PENTACHLOROCYCLOHEXAN

Soils of different texture (from loamy sand to clay) were treated with Carbon 14-labelled insecticides (10 ppm), and their volatilization during consecutive 14-day drying cycles (from 1/3 to 15 bars suction) was determined by liquid scintillation of trapped pesticide vapours. Neither insecticide evaporated at either temperature applied (30 degree and 55 degree C) after soil moisture decreased to less than a monolayer of water; the insecticides were subject to volatilization over a longer period of time from fine-textured than from coarse-textured soils. After 3 cycles of wetting and drying at 55 degree C, the amount of DDT converted to DDE varied from 6.7 to 21.2%; degradation of lindane to gamma-pentachloro-cyclohexene occurred at both temperatures.

357

Anaerobic Conversion of DDT to DDD and Aerobic Stability of DDT in Soil

Guenzi, W.D.; Beard, W.E.

Soil Sci. Soc. Am. Proc., 32(4), 522-524; 1968

ANAEROBIC; CONVERSION; DDT; DDD; AEROBIC; SOILS

358

Anaerobic Biodegradation of DDT to DDD in Soil

Guenzi, W.D.; Beard, W.E.

Science, 156(3778), 1116-1117

BIODEGRADATION; DDT; DDD; SOILS

359

Influence of Soil Treatment on Persistence of 6 Chlorinated Hydro Carbon Insecticides in the Field

Guenzi, W.D.; Beard, W.E.; Viets, F.G., Jr.; Us Department of Agriculture, Soil and Water Conservation Research Division, Northern Plains Branch, Fort Collins, Co

Soil Sci Soc am Proc 35 (6). 1971 510-513

PERSISTENCE; SOILS; INSECTICIDES; CHLORINATED HYDROCARBONS; DDT; HEPTACHLOR; LINDANE; DIELDRIN; ENDRIN; DDD; LUCERNE; FLOODING; SILTY CLAY LOAM; LOAM; CLAY; WATER

25 ppm of DDT, heptachlor, lindane, dieldrin, endrin and DDD were added to flooded and non flooded calcareous silty clay loam containing 0 and 0.25% chopped lucerne. The non flooded soil received 2.5 cm water/week and was either undisturbed or the top 8 cm was mixed every 2 weeks for 22 weeks. In the non flooded soil neither soil mixing nor lucerne affected DDD, DDT, dieldrin and endrin concentrations. Lindane and heptachlor concentrations decreased during the 22 weeks and with soil mixing. In the flooded soil lindane, heptachlor and DDT concentrations decreased rapidly; endrin concentrations decreased but to a lesser degree. The concentrations of lindane, heptachlor, DDT and endrin were decreased by lucerne addition but DDD and dieldrin concentrations were higher in the lucerne-treated soil than in the non-amended soil.

360

Microbial Degradation of Organic Pollutants of Industrial Origin

Gunner, H.B.

U.S. Gov Res Develop Rep 71(3). 1971 40-41 PB-195 982

DIAZINON; INSECTICIDES; INDUSTRY; DEGRADATION

361

The Distribution and Persistence of Diazinon Applied to Plant and Soil and Its Influence on Rhizosphere and Soil Microflora

Gunner, H.B.; Zuckerman, B.M.; Walker, R.W.; Miller, C.W.; Deubert, K.H.; Longley, R.E.; The Institute of Agricultural and Industrial Microbiology, Amherst and the Cranberry Experiment Station, East Wareham, MA

Plant and Soil, 15(2), 249-264; 1966, October

DISTRIBUTION; PERSISTENCE ; DIAZINON; RHIZOSPHERE; SOIL MICROFLORA; ORGANOPHOSPHORUS INSECTICIDES; INSECTICIDES; PLANTS; SOILS

362

Symposium on Residues of Pesticides and Other Contaminants in the Total Environment

Gunther, F.A.

Residue Rev., 49, 1-151; 1973

RESIDUES; PESTICIDES; REVIEW

363

Residue Reviews Vol 34

Gunther, F.A.

Residue Rev 1971 184

PESTICIDES; INSECTICIDES; FOOD; FEEDS

364

Effect of Sevin and Baygon on Some Soil Biological Process and Their Degradation by Soil Organisms

Gupta, K.G.; Sud, R.K.; Aggarwal, J.C.

UNESCO and WHO Global Impacts of Applied Microbiology, 4th International Conference Sao Paulo, Brazil, July 23-28, 1973, 35 p.; Unipub, Inc., P.O. Box 433, New York, NY; 1973

PESTICIDES; SEVIN; BAYGON; SOIL; DEGRADATION

365

Studies of Aldrin and Chlordane in Silt Loam Soils and their Possible Translocation in Field Corn-M in New-York

Gutenmann, W.H.; Greenwood, R.A.; Gyrisco, G.G.; Little, R.J.

J Econ Entomol., 65(3), 1972 842-844

INSECTICIDES; ALDRIN; CHLORDANE; SILT; LOAM; SOILS; TRANSLOCATION; CORN

366

Adsorption and Elution Behavior of Plant Protective Agents in Soils

Guth, J.A.; Div. Agrarchem., Ciba-Geigy A.-G., Basel, Switz.

Schriftenr. Ver. Wasser-, Boden-, Lufthyg., Berlin-Dahlem(Swwlae) 1972, No. 37, 143-54; 1972

HERBICIDES; ADSORPTION; ELUTION; SOILS; INSECTICIDES; PESTICIDES; PLANTS; RETENTION; LEACHING; CHLORBROMURON; CHLORTOLURON; DIURON; FLUOMETURON; METOBROMURON; MONURON; AMETRYNE; ATRAZINE; PROMETRYNE; TERBUTRYNE; METHIDATHION; PENETRATION; ADSORPTION

The retention and leaching behavior of chlorbromuron, chlortoluron, diuron, fluometron, metobromuron, monuron, ametryne, atrazine, prometryne, terbutryne, methidathion, and GS-13006 (S-(2-methoxy-5-oxo - squared-1,3,4-thiadiazoline-4-yl methyl)-0,0-diethyl dithiophosphate) in different soil types were studied. The herbicides were placed on 30-cm soil columns which were then watered to correspond to 200 mm of rain in 48 hours. The compounds penetrated to depths of 8-24 cm, 8-28 cm, 4-18 cm, and 2-10 cm in four soil types. Penetration was lowest in the soil with the highest clay content. The logarithm of the depth of penetration was inversely proportional to the soil humus content. The depth of penetration was also inversely proportional to the adsorption constant of the pesticide. The depth of penetration exceeded 30 cm only for pesticides with adsorption constants less than unity.

367

Dissipation of Urea Herbicides in Soil

Guth, J.A.; Geissbuhler, H.; Ebner, L.; Agrochem. Div., CIBA, Basle, Switzerland

Meded. Rijksfac. LandbWet. Gent., 34, 1027-1037; 1969

HERBICIDES; SOILS; DISSIPATION; FLUOMETURON; COTORAN; METOBROMURON; PATORAN; CHLORBROMURON; MALORAN; CROPS

Dissipation curves of the urea herbicides fluometuron (Cotoran), metobromuron (Patoran) and chlorbromuron (Maloran) in the 0-5 cm layer of different soils are presented and the differences in behaviour are discussed. Although the compounds were applied at twice the normal rate, dissipation rates were sufficiently high to prevent effective residual action for subsequent crops.

368

Pending Legislative Restrictions on the Use of Agricultural Chemicals on Tobacco

Guthrie, F.E.; Sch. Agric. Life Sci., North Carolina State Univ., Raleigh, NC

Beitr. Tabakforsch., 7(3), 195-202; 1973

PESTICIDES; RESIDUES; TOBACCO; REVIEW; INSECTICIDES; REGULATION

369

Accumulation Circulation and Persistence of Herbicides in the Environment

Gzhegotskii, M.I.; Morcz, A.M.

Gig Sanit., 35(5), 79-83; 1970

ACCUMULATION; PERSISTENCE; HERBICIDES; REVIEW; PLANTS

370

Movement of Pesticides by Runoff and Erosion

Haan, C.T.; Agric. Eng. Dep., Univ. Kentucky, Lexington, Ky.

Trans. Asae (Amer. Soc. Agr. Eng.)(TAAEAJ) 1971, 14(3) 445-7,449; 1971

INSECTICIDES; WATER; RUNOFF; EROSION; DDT; ALDRIN; DIELDRIN; MOVEMENT; PESTICIDES

With a normal pesticide application rate equivalent to 1.5 lb/acre, the concentrations of Aldrin, Dieldrin, and DDT in eroded maury silt loam soil were 10-30 ppm while those in the runoff water were only 1-70 ppb. The sediment carried more than twice as much insecticide from the controlled field plots as did the water. Applying these insecticides to the soil surface shortly before a rainfall produces no more potential for insecticides in the runoff water and eroded soil than applying the insecticides several days before a rainfall.

371

Occurrence and Persistence of Picloram in Grassland Water Sources

Haas, R.H.; Scifres, C.J.; Merkle, M.G.; Hahn, R.R.; Hoffman, G.O.

Weed Res 11 (1), 1971 54-62

HERBICIDES; GAS CHROMATOGRAPHY; RAINFALL; RUNOFF; OCCURRENCE; PERSISTENCE; PICLORAM; GRASSLAND; WATER

372

Detailed Characterization of Soil and Vegetation on Selected Sites to Serve as Basis for Future Evaluation of Effect of Radioactive Contamination

Haghiri, F.; Ohio Agricultural Research and Development Center, Wooster

Technical Progress Report, March 1, 1969--November 26, 1969, 73 p.; 1969

AGRICULTURE; SOILS; VARIATIONS; STRONTIUM 90; CROPS; ABUNDANCE; FENAC; BENZAC; TRIFLURALIN; CIPC; PYRAMIN; DIQUAT; ADSORPTION; PH; YTTRIUM 90; CLAY; LEACHATE; RUNOFF; UPT[illegible]; GRAVEL MULCH; MULCH; WHEAT; CORN; GRASS; LIMING; MOVEMENT; ROTATION; REMOVAL; DOWNWARD MOVEMENT; DISTRIBUTION; WINTER WHEAT; STRAIN; CHAFF; GRAINS; CORN FODDER; PARAQUAT; STRONTIUM ION; DISPLACEMENT; BORON; METHYLATION; FATTY ACIDS; MICRO-PLOTS; ELECTRO DIALYZED; FRACTIONATION; INFRARED ANALYSIS; GAS CHROMATOGRAPHY; SOYBEAN; RADIOACTIVITY; VEGETATION MUCK ACIDITY; PESTICIDES; TRANSPORT; CALCIUM OXIDES; LIME; HERBICIDES; ABSORPTION; LEACHING; LOSS; METABOLISM; PLANTS; WATER; RETENTION

The movement of Sr 90 in the soil profile and the removal of Sr 90 by runoff, leachate, and plants uptake as influenced by soil and crop management practices are presented. Over a 7 year period, the net rate of Sr 90 loss from 0 to 4 inch depth by various processes was maximum under gravel mulch and minimum under permanent grass cropping systems. The distribution of Sr 90 in the top 12 inches of soil profile was influenced by cropping system and liming. The concentration of Sr 90 at 3 to 12 inch depth under gravel mulch was approximately 10 times higher than permanent grass system. The application of high rates of lime reduced the downward movement of Sr 90. The percent of the initial application of Sr 90 removed by runoff decreased while its loss by leachate increased during the 7 year period. The distribution of Sr 90 in various part of the winter wheat plant during 1968 to 1969 was 65% in straw, 27% in chaff, and 8% in grain. The distribution of Sr 90 in corn fodder was 99% while in shelled corn it was 1% of the total Sr 90 taken up by the corn plant. The total percent Sr 90 removed by runoff, leachate, and plant uptake after a 7 year period was 16,407, 13,655, 12,481, 10,828, and 9,231 for gravel mulch, rotation a (low lime), continuous corn, rotation b (high lime), and permanent grass respectively. The effects of various rates of fenac, benzac, trifluralin, CIPC, Pyramin, and diquat herbicides on the absorption of Sr 90 by soil were studied. Among these herbicides, diquat was the most effect in releasing from soil or reducing the adsorption of Sr 90 by soil. Its effect was more pronounced under low than high pH soil. High rates of lime had a depressing effect on the removal of Sr 90-Y 90 by leaching with water in the presence of paraquat herbicide. Paraquat appears to be most effective in replacing strontium ion in acid soils with low clay and low organic matter contents. The two soils (Dunbar and Lynchburg), furnished by the USDA, were treated with Sr++ and the retention of Sr++ was compared to other soils. The curves for the adsorption and displacement of Sr 90 was similar to the soils used in previous experiments and reported in earlier reports. The non-displaceable Sr was approximately 30% of the total adsorbed. Soil samples were analyzed for boron content after the samples were methylated at various rates of BF3-MeOH. The boron content of the samples increased with increasing rates of BF3. Therefore, methylation of soil organic matter with the BF3 method is of a limited value in soil's work. It would be of value in soil organic matter fractions that contain compounds that are not reactive with BF3, for example fatty acids. The sample of runoff water from micro-plots was electrodialyzed and Sr 90 was detected in the anode chamber. The sample is being fractionated for IR and gas chromatographic analyses. The distribution of Sr 90 from soybean and corn tissue in soil columns was determined. The least movement was in the muck soil column and the most movement in the Wooster soil column. There were no conclusive differences between the tissues. (Auth)

373

Runoff and Soil Losses on Hagerstown Silty Clay Loam Effect of Herbicide Treatment

Hall, J.K.; Pawlus, M.

J. Soil Water Conserv., 28(2), 73-76; 1973

CORN; OATS; ATRAZINE; HERBICIDES; RESIDUES; CLAY; SILT; RUNOFF; LOAM; SOILS

374

Losses of Atrazine in Runoff Water and Soil Sediment

Hall, J.K.; Pawlus, M.; Higgins, E.R.

J Environ Qual 1 (2). 1972 172-176

ZEA-MAYS; OATS; HERBICIDES; SOILS; SEDIMENTS; ATRAZINE; RUNOFF

375

Diffusion and Volatilization

Hamaker, J.W.; AG-Org. Dept., Dow Chem. Co., Walnut Creek, Calif.

Org. Chem. Soil Environ. (26DJAE), 1, 341-97; 1972

REVIEW; DIFFUSION; VOLATILIZATION; SOILS; POROUS MEDIUM; INSECTICIDES; PESTICIDES; HERBICIDES

376

Decomposition, Quantitative Aspects

Hamaker, J.W.; Ag-Org. Dep., Dow. Chem. Co., Walnut Creek, Calif.

Org. Chem. Soil Environ.(26DJAE) 1972, 1, 253-340; 1972

REVIEW; SOILS; PESTICIDES; DEGRADATION; INSECTICIDES; HERBICIDES; DECOMPOSITION

377

Adsorption

Hamaker, J.W.; Thomposon, J.M.

Part of Goring, C.A.; Hamaker, J.W. (Eds.), Organic Chemicals in the Soil Environment, Vol. 1, Marcel Dekker, Inc., New York, NY, (p. 49-143) 440 p.; 1972

ADSORPTION; SOILS

378
Degradation of 3,5-Dinitro-O Cresol by RHIZOBIUM and AZOTOBACTER-SPP

Hamdi, Y.A.; Tewfik, M.S.; Minist. Agric., Orman, Giza, U.A.R.

Soil Biol Biochem 2 (3). 1970 163-166; 1970

CHROMATOGRAPHY; DEGRADATION; CRESOL; 3,5-DI ITRO-O CERSOL; HERBICIDES

Degradation of the herbicide by 31 RHIZOBIUM strains and 5 AZOTOBACTER strains varied from slight to almost complete. A major degradation product produced by R. LEGUMINOSARUM strain 325 was identified chromatographically as 3-amino-5-nitro-o-cresol, 2 other products were detected in 3 days, and 2 more in 7 days.

379
The Breakdown of Trifluralin by Soil Micro-Organisms

Hamdi, Y.A.; Zahran, M.K.; Tewfik, M.S.; U.A.R. Dep. Agric.

PANS, 15, 589-592; 1969

TRIFLURALIN; COTTON; SOILS; DECOMPOSITION; HERBICIDES; GLUTAMATE; LACTATE; ACETATE; YEASTS; PH; DEGRADATION; BREAKDOWN; MICROORGANISMS

A bacterial strain, isolated from trifluralin-treated cotton soil (1 litre/feddan) on 2-month incubation, was capable of decomposing the herbicide in the presence of glutamate, lactate, acetate and yeast extract (maximum decomposition at pH 7.4); in a 0.01% trifluralin medium, 95% of the compound was degraded within 21 days, whereas none was degraded at a concentration of 0.05%.

380
Problems of Persistence of Insecticide Residues in Soil

Hameed, S.F.

Pesticides (BOMBAY) 5(6), 21-22; 1971

TRANSLOCATION; PERSISTENCE; INSECTICIDE; RESIDUE; SOILS

381
Fate and Effects of Pesticides in Aquatic Environments

Hamelink, J.; Dep. For. Conserv., Purdue Univ., Lafayette, Indiana

Hazardous Chem. Handl. Disposal, Proc. Symp., 2nd(24IQac) 1971, 19-28; 1971

REVIEW; PESTICIDES; WATER; FATE; AQUATIC ECOSYSTEMS; DISTRIBUTION; EXCHANGE EQUILIBRIUM

A review with 34 references on physics. Factors, such as the existance of exchange equilibrium, which controls the distribution of pesticides in aquatic environments.

382
Persistence of Herbicides in Fallow Desert Cropland

Hamilton, K.C.; Arle, H.F.; Arizona Agricultural Experimental Station, Tucson, Arizona

Weed Sci 20 (6). 1972 573-576; 1972

TRIFLURALIN; PROMETRYNE; ATRAZINE; DIURON; PERSISTENCE; HERBICIDES; DESERT; CROPLAND; CROPS; SOILS; DISKING; SUGAR BEETS; RESIDUES; SORGHUM

Four herbicides were applied at 6-month intervals, and incorporated by disking, to desert cropland soils at two locations. Trifluralin (alpha,alpha,alpha-trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine) was applied at 0.9 kg/ha; and 2,4-bis(isopropylamino)-6-(methylthio)-s-triazine (prometryne), 2-chloro-4-(ethylamino)-6-(isopropylamino)-s triazine (atrazine), and 3-(3,4-dichlorophenyl)-1, 1-dimethylurea (diuron) were applied at 1.8 kg/ha. Following treatment the soils remained fallow without irrigation for 24, 18, 12, 6, or 0 months before planting eight crops. Sugarbeet (BETA VULGARIS L.) growth was affected 24 months after applications of trifluralin. Growth of two or three crops at each location was affected 18 months after application of prometryne. Residues of atrazine and diuron usually caused greater injury to most crops than did prometryne or trifluralin. Six months after the first planting, four additional crops were planted. In plots planted 30 months after treatment diuron reduced sorghum (SORGHUM BICOLOR (L.) Moench) stands by 70% and reduced fresh weights of three crops at mesa. Trifluralin reduced fresh weight of sorghum by 80% at yuman. Crops responded differently to herbicide residues at the two locations. Injury to crops was most severe at mesa despite higher rainfall during the fallow period at this location.

383
The Environment and Herbicide Performance

Hammerton, J.L.

Part of Bawden, F. (President), Proceedings of the 9th British Weed Control Conference held Nov. 18-21, 1968 at Brighton, England, Symposium, Vol. 1,2,3 (p. 1088-1110) 1368 p.; 1968

RAINFALL; SOILS; LIGHT; HERBICIDES

384
Model Tests Made With a View to Determining the Rate of Decomposition of the Herbicide Peroximpham in the Soil in the Presence of Herbicide Secondary Components

Hamroll, B.; Jumar, A.; Forschungszent. Pflanzenschutz-Schaedlingsbekaempfungsm., Veb Fahlberg-List, Magdeburg, East Germany

Chem. Tech. (Leipzig)(CHTEAA) 1973, 25(7) 423-4; 1973

PROXIMPHAM; DEGRADATION; SOILS; HERBICIDES; SYNERGISM; GAS CHROMATOGRAPHY; HUMUS; CHLORPROPHAM; DIURON; LENACIL; FENURON; MODEL; DECOMPOSITION; RATE

The degradation of proximpham in a humus (2.7%)-enriched soil sample was studied by gas chromatography. The microbial degradation of proximpham when added to the soil in combination with another herbicide such as chlorpropham, diuron, lenacil, or fenuron was decreased as compared with the decomposition rate of proximpham when used alone. When using combinations of proximpham plus another herbicide the duration of action of proximpham was prolonged as compared with that observed with proximpham alone. The half-life of proximpham, alone, was 8.9 days, but was increased to 15, 14.3, 13.0, and 12.5 days when combined with diuron, chlorpropham, lenacil, and fenuron, respectively.

385
Effect of Nutrients on the Decomposition of the Herbicides Atrazine and Linuron Incubated with Soil

Hance, R.J.; Week Res. Organization, Agricultural Research Council, Begbroke Hill/Yarnton/Oxford, England

Pestic. Sci. (PSSCBG), 4(6), 817-822; 1973

ATRAZINE; LINURON; SOILS; DEGRADATION; DECOMPOSITION; NUTRIENTS

386
Complex Formation as an Adsorption Mechanism for Linuron and Atrazine

Hance, R.J.

Weed Res 11 (2-3). 1971 106-110.

HERBICIDES; ADSORPTION; LINURON; ATRAZINE

387
Some Aspects of Triallate Volatility

Hance, R.J.; Holroyd, J.; McKone, C.E.; Great Britain Dept. of Education and Science, Agricultural Research Council, Weed Research Organization, Begbroke Hill, Sandy Ln., Yarnton, Oxford, Ox5 1PF, Eng.

Pestic Sci 4 (1). 1973 13-17; 1973

HERBICIDES; WATER; GRANULES; SOILS; EMULSION; TRIALLATE; WATER; VOLATILITY; PERSISTENCE; CARBAMATES

The volatility of triallate (S-2,3-3trichloroallyl N,N-diisopropylthiolcarbamate) from different formulations when mixed with 2 soils containing water at 2%, 6%, and field capacity was estimated in the laboratory. Volatility increased with increasing water content in each case. It was generally highest from an emulsifiable concentrate and lowest from a granule formulation with that from unformulated tirallate intermediatel in a greenhouse experiment, rates of loss of triallate from a dry soil were similar for both emulsifiable concentrate and granule formulations, but from a wet soil and an aluminum foil dish losses were much greater from the emulsifiable concentrate. The persistence of triallate from granules applied in the field was virtually the same for granules containing 2.5%, 5%, or 10% active ingredient.

388.
Adsorption of Isocil and Bromacil from Aqueous Solution Onto Some Mineral Surfaces

Haque, R.; Coshow, W.P.

Environ Sci Technol 5 (2). 1971 139-141

ADSORPTION; ISOCIL; BROMACIL; HERBICIDES

389
Aqueous Solubility, Adsorption, and Vapor Behavior of Polychlorinated Biphenyl Aroclor 1254

Haque, R.; Schmedding, D.W.; Freed, V.H.; Department of Agricultural Chemistry and Environmental Health Sciences Center, Oregon State University, Corvallis, OR 97331

Environmental Science & Technology, 8(2), 139-142; 1974, February

ADSORPTION; VAPOR; POLYCHLORINATED BIPHENYL AROCLOR 1254; PCB; WATER; AROCLOR 1254; SAND; SOILS; AROCLOR; CHLORINE; ISOMERS

The water solubility, adsorption from aqueous solution, and the vapor behavior of the polychlorinated biphenyl Aroclor 1254 have been determined. The aqueous solubility of Aroclor 1254 has been found to be approximately 56 ppb. The extent of adsorption of the PCB's is highly dependent on the nature of the adsorbent. Del Monte sand adsorbs very little as compared to a Woodburn soil. The vapor loss of Aroclor is significant from the sand but negligible from the soil. The vapor loss increases with increasing temperature. In general, the isomers containing fewer chlorine atoms show greater loss as compared to other isomers having more chlorine atoms.

390

The Loss of Alachlor from Soil

Hargrove, R.S.; Merkle, M.G.; Department of Soil and Crop Science, Texas A & M University, College Station, Texas 77843

Weed Sci 19 (6). 1971 652-654; 1971

HERBICIDES; TEMPERATURE; HUMIDITY; GAS CHROMATOGRAPHY; SOILS; ALACHLOR; SANDY LOAM; LOAM; DECOMPOSITION; CLOSED SYSTEM

In a closed system at 22 degrees C there was little decomposition of alachlor added to a fine sandy loam. At 38 degrees and 46 degrees C, decomposition of alachlor into 2-chloro-2,'6'-diethylacetanilide was minimal at 31% and 79% relative humidity and was maximal at 0% relative humidity.

391

Agricultural Research Impact on Environment

Hargrove, T.R.

Iowa Agric. Home Econ. Exp. Stn. Spec. Rep. 69, 7-84; 1972

SOILS; EROSION; PESTICIDES; NUTRIENTS; ENRICHMENT; LIVESTOCK; WASTES; AGRICULTURE

392

Toxicological Studies on Cutworms. 10. Laboratory and Field Microplot Studies on Effectiveness and Persistence of Some Experimental Insectidices Used to Control the Black Cutworm in Organic Soil

Harris, C.R.; Svec, H.J.; Sans, W.W.; Res. Inst., Canada Dep. Agric., London, Ont.

J. Econ. Entomol. (JEENAI) 66 (1) 203-8; 1973

INSECTICIDES; SOILS; CUTWORMS; CHLORPYRIFOS; LEPTOPHOS; VEGETABLES; AGROTIS; FIELD MICROPLOTS; PERSISTENCE

393

Movement of Herbicides in Soil

Harris, C.I.

J. of Wed. Soc. of Amer., 15(3), 214-216; 1967

HERBICIDES; MOBILITY; SOIL COLUMNS; TRANSPORT; SOILS; AROMATIC ACID HERBICIDES; TOLUIDINES

394

Laboratory Evaluation of Candidate Materials as Potential Soil Insecticides. 4.

Harris, C.R.; Res. Inst., Canada Dep. Agric., London, Ontario, Canada

J. Econ. Entomol. (JEENAI) 1973, 66(1) 216-21; 1973

SOILS; CIBA 18244; PIRIMIPHOS; CARBOFURAN; CHLOROPHENYLS; LEPTOPHOS; BAY 92114; PERSISTENCE; INSECTICIDES; INSECTS; MUCK; MINERAL SOIL; FUMIGATION

Of 19 insecticides evaluated in the laboratory as potential soil insecticides, Ciba 18244 (0-(2,5-dichloro-4-iodophenyl) O-ethylphosphonothioate), leptophos, pirimiphos-me (0-(2-diethylamino-6-methyl-4-pyrimidinyl) O,o-dimethyl phosphorothioate), pirimiphos-et (0-(2-(diethylamino)-6-methyl-4-pyrimidinyl) o,o-diethyl phosphorothioate), Bux insecticide mixture, and Bay 92114, warranted further evaluation under field conditions. Most of the experimental compounds were effective broad-spectrum contact insecticides when tested against species of insects representing 5 common orders, but none showed as broad a spectrum of activity as carbofuran. Thirteen of the 19 showed fair to good activity in soil, and of these, 7 were of limited persistence, 4 moderately residual, and 2 highly residual. The direct contact-toxicity, biological activity in moist and air-dry mineral soil and moist muck soil, the initial fumigant activity, and the persistence of biological activity over 48 weeks were determined for these compounds.

395

Factors Influencing the Biological Activity of Technical Chlordane and some Related Components in Soil

Harris, C.R.

J Econ Entomol 65 (2). 1972 341-347

ALDRIN; DIAZINON; HEPTACHLOR; NONACHLOR; CHLORDENE; 1-HYDROXYCHLORDENE; HEXACHLOROCYCLOPENTADIENE; SOILS

396

Behavior of Dieldrin in Soil. Laboratory Studies on the Factors Influencing Biological Activity

Harris, C.R.; Res. Inst., Canada Dep. Agric., London, Ont.

J. Econ. Entomol. (JEENAI) 1972, 65(1) 8-13; 1972

DIELDRIN; INSECTS; SOILS; HUMUS; INSECTICIDES; CLAY; ALDRIN; NYMPHS; CRICKETS;, FLIES; CUTWORMS; MUCK; VOLATILIZATION

The effects of soil organic matter content, clay content, temperature, and moisture level on the activity of Dieldrin in controlling soil insects were studied. Dieldrin was an effective broad spectrum contact insecticide which was as toxic or more so than aldrin to 1st-stage nymphs of the common field cricket, GRYLLUS PENNSYLVANICUS, adult picture-winged flies, CHAETOPSIS DEBILIS, and 3rd- to 4th-stage black cutworms, AGROTIS IPSILON. In moist mineral soil, it was effective but less so than aldrin. Soil type was the major factor influencing biological activity. In moist soils, dieldrin toxicity decreased linearly with increasing organic content. In dry soils, activity appeared to decrease with increasing clay content. Soil temperature and moisture were of secondary importance. Biological activity was positively correlated with increasing temperature in moist and dry mineral soils and in muck. The most pronounced temperature effect occurred in the dry mineral soil. Biological activity was positively correlated with increasing moisture in mineral soils, while the reverse occurred in muck soil. Volatility of dieldrin in soil was also positively correlated with increasing soil temperature.

397
Insecticide Pollution and Soil Organisms

Harris, C.R.; Res. Inst., Canada Dept. Agr., London, Ontario, Canada

Proc. Entomol. Soc. Ont., 100, 14-29; 1969

ALDRIN; HEPTACHLOR; DEGRADATION; ORGANOCHLORINES; ORGANOPHOSPHATES; MICROORGANISMS; CHLORDANE; PHORATE; CARBARYL; ARTHROPOD; ABSORPTION; CROPS; SOILS; INSECTICIDES; EARTHWORMS; PERSISTENCE

A number of materials being developed for insect control are as persistent or more persistent than materials like aldrin and heptachlor which have been banned because of their rather slow rate of degradation. In addition, the rates at which such new compounds must be applied are often greater than those used previously for the organochlorines. In laboratory studies, representative organochlorines and organophosphates have had little effect on soil microorganisms, but soil microorganisms have been shown to be important in the process of degradation of these chemicals. Although many pesticides have little impact on earthworm populations, chlordane, phorate, and carbaryl, which are commonly being substituted for banned organochlorines, have a toxic effect on these animals. Organochlorines have unfavorably altered arthropod populations and resistance to these chemicals has been observed. Although no resistance to the organophosphates has developed in Canada, it is expected that the use of more persistent members of this group will result in more rapid development of resistance. Absorption of residues by crops used for animal feed has been considered a problem while crops used for human consumption do not absorbed hazardous levels of residues.

398
Influence of Temperature on the Biological Activity of Insecticides in Soil

Harris, C.R.

J Econ Entomol 64 (5). 1971 1044-1049

ALDRIN; HEPTACHLOR; DDT; DIAZINON; DURSBAN; METHOMYL; SOILS; INSECTICIDES

399
Factors Influencing the Effectiveness of Soil Insecticides

Harris, C.R.; Res. Inst., Canada Dep. Agric., London, Ont.

Annu. Rev. Entomol.(ARENAA), 17, 17,() 177-98; 1972

REVIEW; SOILS; INSECTICIDES; INSECTS; CLIMATE

A review with 108 references on factors influencing the effectiveness of soil insecticides, such as nature of the insecticide and of the soil, climatic factors and the susceptibility of the insects.

400
Factors Affecting the Volatilization of Insecticidal Residues from Soils

Harris, C.R.; Lichtenstein, E.P.

J. Econ. Entomol., 54, 1038-1045; 1961

VOLATILIZATION; RESIDUES; SOILS; INSECTICIDES

401
Behavior of Dieldrin in Soil. Microplot Field Studies on the Influence of Soil Type on Biological Activity and Absorption by Carrots

Harris, C.R.; Sans, W.W.; Res. Inst., Canada Dep. Agric., London, Ont.

J. Econ. Entomol.(JEENAI) 1972, 65(2) 333-5; 1972

DIELDRIN; SOILS; ORGANOCHLORINE INSECTICIDES; INSECTICIDES; PERSISTENCE; MOVEMENT; TRANSPORT; PLANTS; SOIL MICROPLOT; ABSORPTION; CARROTS

As shown in field experiments, carried out by adding 2 ppm dieldrin to 5 types of soil, the persistence, vertical movement, insecticidal activity and absorption by carrots of dieldrin was proportional to the organic content of the soil, and not to the dieldrin concentration the insecticidal activity was tested on 24- to 48-hr-old nymphs of GRYLLUS PENNSYLVANICUS (cricket).

402
Behavior of Heptachlor Epoxide in Soil

Harris, C.R.; Sans, W.W.; Res. Inst., Canada Dep. Agric., London, Ont.

J. Econ. Entomol.(JEENAI) 1972, 65(2) 336-41; 1972

HEPTACHLOR; EPOXIDE; SOILS; ORGANOCHLORINE INSECTICIDES; INSECTICIDES; CONTACT POISON; HEPTACHLOR EPOXIDE; CRICKETS; FLIES; VAPORIZATION; INSECTS; CUTWORMS; PERSISTENCE; DIELDRIN; SOIL MICROPLOT; CARROTS

Heptachlor epoxide had a higher insecticidal activity than heptachlor as a contact poison, in the laboratory, but was less effective than heptachlor in the soil. The compounds were tested against 24-to 48-hr-old GRYLLUS PENNSYLVANICUS (cricket), against adult picture-winged flies (CHAETOPSIS DEBILIS) and against 3rd-stage larvae of black cutworm (AGROTIS IPSILON). In soil heptachlor epoxide vaporized to an extent sufficient to cause fumigant toxicity to insects. The toxicity of heptachlor epoxide in moist soil was negatively correlated with organic content. In mineral soil heptachlor epoxide was more persistent than heptachlor, but was slightly less persistent than dieldrin. Microplot field trials with 3 types of soil treated with 2 ppm heptachlor epoxide indicated that the insecticidal activity, the absorption by the carrot and the mobility in soil of heptachlor epoxide were proportional to the organic content of the soil rather than the insecticide concentrations.

403

Insecticide Residues in Soils on 16 Farms in Southwestern Ontario-1964, 1966, and 1969

Harris, C.R.; Sans, W.W.; Res. Inst., Canada Dep. Agric., London, Ontario, Canada

Pestic. Monit. J.(PEMJAA), 5(3), 259-67; 1971

INSECTICIDES; RESIDUES; SOILS; HEPTACHLOR; HEPTACHLOR EPOXIDE; GAMMA-CHLORDANE; ALDERIN; DIELDRIN; ENDRIN; DDT; DDE; DDD; FARM; ORCHARDS; VEGETABLES; TOBACCO; FIELD CROPS; ORGANOCHLORINEINSECTICIDES; ORGANOPHORUS INSECTICIDES

The concentration of organochlorine insecticide residues in soils on 16 ontario farms depended on the type of culture, and was in the decreasing order: orchard, vegetable, tobacco, and field crop. The highest levels were heptachlor 0.4, heptachlor epoxide 0.24, gamma -chlordane 0.63, aldrin 2.13, dieldrin 3.33, endrin 6.55, DDT 97.7, DDE 12.65, and DDD 3.3 ppm. Organophosphorus insecticides were also present in some of the soils.

404

Exploratory Studies on Occurrence of Organochlorine Insecticide Residues in Agricultural Soils in Southwestern Ontario

Harris, C.R.; Sans, W.W.; Miles, J.R.

J. Agr. Food Chem., 14(4), 398-403; 1966

INSECTICIDES;S; ORGANOCHLORINE INSECTICIDE RESIDUES; SOILS

405

Insecticides and the Soil Environment

Harris, C.R.; Thompson, A.R.; Tu, C.M.; Res. Inst., Canada Dep. Agric., London, Ontario, Canada

Proc. Entomol. Soc. Ont. (PESOAL) 1972, 102, 156-68; 1972

REVIEW; DASANIT; SOILS; DEGRADATION; PERSISTENCE; DASANIT SULFONE; ABSORPTION; ANIMALS; MICROORGANISMS

A review with 10 references mostly the author's own work, on the persistence and degradation of dasanit in soils, factors affecting the insecticide activity of dasanit and dasanit sulfone in soil, absorption of dasanit and dasanit sulfone residues by plants, and effects of dasanit and dasanit sulfone on nontarget soil animals and microorganisms.

406

Watershed Studies of Agricultural Pollution

Harrold, L.L.; Edwards, W.M.

Ohio Rept. Res. Develop., 55(4), 85-6; 1970

SOILS; ADSORPTION; AIR; WATER; WATERSHEDS; STORM RUNOFF; DIELDRIN; RUNOFF; WATERFLOW; VOLATILIZATION; EROSION; MOVEMENT; PESTICIDES; ROOT SYSTEM; PERCOLATION; METHOXYCHLOR; STREAMFLOW; WASTES; RUNOFF; TRANSPORT; 2,4,5-T; ADSORPTION

Long-term research on pesticidal pollution of air, water and soil has been undertaken at the North Appalachian Experimental Watershed, Coshocton County, Ohio, by the U.S. Department of Agriculture and the Ohio Agricultural Research and Development Center, Wooster, Ohio. Preliminary findings are reported in this paper. Pesticide concentrations in storm runoff are being monitored at the outlet of a 1.69-acre cornfield watershed. In the preliminary work, dieldrin at 5 lb/acre was disked 3 inches deep into this field. In one instance, when storm runoff occurred 12 days after application, 18.4 ppb of dieldrin was found in the runoff water. By the 20th day, the dieldrin concentration had dropped to 7 ppb; by the eighth month, it was less than 3 ppb. During this time, 2300 mg, or 0.063%, of the applied dieldrin was lost in runoff water. In a case where the first runoff occurred 55 days after application, 3 ppb was found in the waterflow. After 12 months, 289 mg, or 0.005%, of the applied dieldrin had been lost in runoff. Air pollution resulting from the surface application of dieldrin was also investigated in this field. The preliminary results showed that volatilization and aerial transport accounted for more dieldrin loss than surface runoff and erosion. The movement of pesticides into subsurface waters is being investigated in 8-ft-deep,, grass-covered lysimeters with surface areas of 0.002 acre. Methoxychlor at 20 lb/acre and 2,4,5-T at 10 lb/acre were applied to the surface. Surface runoff and water that had percolated at least 6 feet below the grass root system were analyzed for residues. During the 14 months after application, only a trace of 2,4,5-T and no methoxychlor were found in the percolated water. Six months after treatment, the 2,4,5-T in surface runoff had been reduced from 300 to 3 ppb. Methoxychlor in runoff ranged from 9 to less than 1 ppb; it did not decrease systematically during the first year after application. The movement of pesticides in streamflow is also being monitored at a gage that measures discharge from 303 acres of mixed cropland, some fields of which are treated with dieldrin. Because dieldrin is quickly adsorbed on soil particles, erosion is another source of pesticidal pollution that is being studied. The research includes pollution from barnyard wastes and crop nutrients whose preliminary findings are also reported.

407

Herbicide Behavior in the Soil. 1. Physical Factors and Action Through the Soil

Hartley, G.S.

Part of Audus, L.J. (Ed.), The Physiology and Biochemistry of Herbicides, Academic Press, London and New York, (p. 111-161); 1964

HERBICIDES; SOILS; BIOCHEMISTRY; MOVEMENT

408

Evaporation of Pesticides

Hartley, G.S.

Part of Gould, R.F. (Ed.), Formualtions Research, Physical and Colloidal Chemical Aspects, Adv. Chem. Series, 86, 115-134; 1969

EVAPORATION; PESTICIDES

409

Decomposition of Methomyl in Soil

Harvey, J.J.; Pease, H.L.; Biochem. Dep., E. I. Du Pont De Nemours And Co., Inc., Wilmington, Del.

J. Agr. Food Chem.(Jafcau) 1973, 21(5) 781-6; 1973

METHOMYL; SOILS; INSECTICIDES; RUNOFF; WATER; CARBON 14; DEGRADATION; VOLATILIZATION; RESIDUES; BREAKDOWN; TRACER; MOVEMENT

Laboratory studies of soils treated with (Carbon14) methomyl show that methomyl degrades rapidly to (Carbon14) carbon dioxide as the end product. Under field conditions in Delaware only 1.8% of the applied (Carbon14) methomyl remained intact in the soil after one month exposure, while 70.7% of the applied radioactivity had been lost from the soil by volatilization, presumably as (Carbon14) carbon dioxide based on the laboratory studies The small amounts of residual radioactive compounds which could be extracted from this soil consisted of methomyl, s-methyl n-hydroxythioacetimidate, and traces of a mixture of very polar compounds. Methomyl and its hydrolysis product had completely disappeared from treated soil after one year. Similar results were obtained in Florida and North Carolina. To account for the small, unextractable balance of c14 activity, evidence is presented for reincorporation of Carbon14 into normal components of the soil organic matter following breakdown of (Carbon14) methomyl into 14CO2 or other small fragments. A runoff study with nonradiolabeled methomyl under farm use conditons show that methomyl does not move laterally into untreated areas with runoff water.

410

Influence of Cropping and Activated Carbon on Persistance of Atrazine in Sand

Harvey, R.G.; Dep. Agron., Univ. Wisconsin, Madison, Wis.

Weed Sci.(WEESA6) 1973, 21(3) 204-6; 1973

ATRAZINE; ACTIVATED CARBON; CORN; HERBICIDES; PERSISTENCE; SOILS; OATS; CROPS; SAND; RESIDUES

The persistence of 2-chloro-4-(ethylamino(-6-(isopropylamino)-s -s-triazine (atrazine) residues under greenhouse conditions was affected by levels of activated carbon added to a silica sand potting medium and by up to four consecutive corps of corn (ZEA MAYS L.). Degradation of atrazine within the sand and removal by the corn crops were both reduced by activated carbon. Atrazine removal by successive crops of corn reduced injury to oat seedlings grown on the sand alone, and absorption by 1.2 g of carbon per kilogram of sand prevented oat injury both with and without cropping. Although 0.4 g/kg of activated carbon inhibited atrazine removal by corn, oat seedlings were not protected from the residues remaining. When exposed to alternate freezing and thawing, the ability of 0.4 g/kg of activated carbon to deactivate atrazine was reduced causing increased oat injury.

411

Soil Adsorption and Volatility of DiNitro Aniline Herbicides

Harvey, R.G.

Weed Sci., 22(2), 120-124; 1974

ANILINE BENEFIN; CHLORNIDINE; DINITRAMINE; FLUCHLORALINE; NITRALIN; ISOPROPALIN; ORYZALIN; TRIFLURALIN; WEEDS; SOILS; ADSORPTION; VOLATILIZATION;; HERBICIDES

412

Interactions Between Organophosphorus Compounds and Soil Materials. Part 1. Adsorption of Ethylmethylphosphonofluoridate by Clay and Organic Matter Preparations and by Soils

Hayes, M.H.; Lundie, P.R.; Stacey, M.; The University, Birmingham, Uk

Pestic Sci 3 (5). 1972 (Recd 1973) 619-629

MONTMORILLONITE; KAOLINITE; PESTICIDES; SOILS; CLAY; ORGANOPHOSPHATES: ADSORPTION; PHOSPHONOFLUORIDATE; ORGANIC MATTER

The phosphonofluoridate was absorbed from the vapour phase onto the dry clay preparation by physical-chemical forces but was not adsorbed by the organic soil materials. Water competed effectively with the phosphonfluoridate for adsorption sites and it is concluded that this molecule would be most effectively retained by dry soils with low organic matter contents and high clay contents.

413

Application of Microcalorimetry to the Study of Interactions Between Organic Chemicals and Soil Constitutents

Hayes, M.H.; Pick, M.E.; Toms, B.A.; Dep. Chem., Univ. Birmingham, Edgbaston/Birmingham, Engl.

Sci. Tools (SCTCAB) 19 (1) 9-12; 1972

CALORIMETRY; HERBICIDES; SOILS; ADSORPTION; DIQUAT; PARAQUAT; CLAY; MICROCALORIMETRY; ORGANIC CHEMICALS

414

Application of Microcalorimetry to the Study of Interactions Between Organic Chemicals and Soil Constituents

Hayes, M.H.; Pick, M.E.; Toms, B.A.; Dep. Chem., Univ. Birmingham, Edgbaston/Birmingham, Engl.

Sci. Tools(SCTCAB) 1972, 19(1) 9-12; 1972

CALORIMETRY; HERBICIDES; SOILS; ADSORPTION; DIQUAT; PARAQUAT; CLAY; ORGANIC CHEMICALS

415

Recovery of Pesticide Residues from Chernozemic Soils

Head, W.K.; McKercher, R.B.; Saskatchewan Inst. Pedol., Univ. Saskatchewan, Saskatoon, Sask.

Can. J. Soil Sci.(CJSSAR) 1971, 51(3) 423-30; 1971

PESTICIDES; RESIDUES; SOILS; ALDRIN; DIELDRIN; LINDANE; TRIALLATE; DDT; CHERNOZEMIC SOILS

As shown by gas chromatography, maximum average recoveries of aldrin, dieldrin, lindane, and triallate, added to chernozemic soils at the 0.02 ppm level were 77-117%. Maximum recoveries for DDT added to the soil at the 0.2 ppm level was 72-92%. The recovery generally increased with the moisture content of the soil, but, the optimum moisture content was dependent on both the pesticide and the soil. Results are given for analysis of chernozemic soils with histories of pesticide application.

416

Biocide Contamination of Waters

Heinisch, E.; Biol. Zentralanst. Berlin, Dtsch. Akad. Landwirtschaftswiss. Berlin, Kleinmachnow, E. Germany

Fortschr. Wasserchem. Ihrer Grenzgeb. (FWIGAV), No. 14, 151-8; 1972

REVIEW; BIOCIDES; WATER; DDT; SOILS; SURFACE; LINDANE; CHLORINATED HYDROCARBONS

417

Plant Protection Agent Residues in Soil as the Cause of Unintended Secondary effects

Heinisch, E.; Beitz, H.; Reifenstein, H.; Hartisch, J.; Seefeld, F.; Dunsirg, M.

Nachrichtenbl. Deut. Pflanzenschutzdienst, 24(12), 251-6; 1970

RESIDUES; INSECTICIDES; RESIDUES; DDT; SOILS; POWDER SPRAY; DUST; INCRUSTATION; AEROSOL; MIST; LINDANE; METHOXYCHLOR; TOXAPHENE; DIFOCOL; CHLORINATED HYDROCARBONS; ACARICIDES; HERBICIDES; S-TRIAZINE; UREA; CHLORAL HYDRATE; CHLORATE; CARROTS; PROPAZINE; TOBACCO; KOHLRABI; SIMAZINE; PERSISTENCE; ATRAZINE; PROPAZINE; WEEDKILLERS; DEFOLIANT; FODDER; POTATOES; SANDY SOILS; TRICHLOROACETIC ACID; FUNGICIDES; PENTACHLORONITROBENZENE

The most important insecticides known to have side effects are reviewed. Foremost among the dangerous residues is DDT, which occurs in 95% of East German soils in significant amounts. Eleven percent of samples contained greater than 2 ppm DDT, some even 12 ppm. The intensity of residues increased: dust less than powder spray less than incrustation medium less than aerosol less than mist. Lindane levels in soil samples were not so high. Only 16.3% of samples showed lindane residues and only 0.3% had 2 ppm. Apart from methoxychlor, toxaphene and difocol, residues of other chlorinated hydrocarbon insecticides and acaricides were insignificant. Of the herbicides employed in East Germany, s-triazines, urea derivatives, chloral hydrate and chlorate are the most persistent. The well-known metabolism of s-triazines is briefly outlined. That of its derivatives, together with their toxicology, is less well researched. The treatment of carrots with propazine led to the partial or total destruction of tobacco and kohlrabi grown on the same soil the following year. Thin-layer chromatographic examination of the treated soils showed considerable penetrations and persistence of these preparations (simazine, atrazine and propazine). Up to 0.5 mg/kg residues were found after various cultural practices. Dimerization occurs in soil with the formation of ZAO compounds, some of which are carcinogenic. Chlorate is used in East Germany as a weed killer and defoliant in fodder and potato cultivation. Although it readily disappears in sandy soil, it persists and is toxic in heavy ones. Chloral hydrate, used as a weed killer, is converted into the active trichloroacetic acid, which is toxic and can be used used in sandy soil. Fungicides which are cause for concern are the organomercury compounds and pentachloronitrobenzene.

418

Accelerating the Decomposition of the Active Principles of Plant Protectants in the Soil

Heinisch, E.; Reifenstein, H.; Winkler, R.; Inst. Pflanzenschutzforsch. Kleinmachnow, Akad. Landwirtschaftswiss., Klein Machnow, E. Ger.

Arch. Pflanzenschutz(AVPZAR) 1972, 8(4) 313-21; 1972

CHLORATE; HERBICIDES; SOILS; SULFITE; SPENT LIQUOR; AGRICULTURE; NITRITE; INDUSTRY; DECOMPOSITION; DISSIPATION; REDUCTION; LINDANE; TRIAZINE; SODIUM CHLORATE; SOILS; LOAM; PERSISTENCE; PH; DECONTAMINATION; REMOVAL

Methods for accelerating the dissipation of pesticide residues from the soil generally entail assisting natural degradation and removal processes. Intensive cultivation and irrigation of a truck gardening field permitted the removal of the large quantities of lindane (3-4 times the recommended annual application rate) required for cultivating two crops a year. Calcium polysulfide has been suggested as a soil additive to promote chemical decomposition of triazine herbicides. Sodium chlorate residues have persisted at toxic levels for up to six weeks after application in loam soils. Since chlorate ion is a strong oxidizing agent in acid solution, application of a sulfite waste liquor to soil was studied for neutralization of chlorate residues. In vitro tests revealed that the chlorate-chloride reduction is highly pH-dependent and generally does not proceed to completion. The sulfite in the solution (as well as sodium nitrite, which could also be considered as a soil decontaminant because of its availability in large quantities at a low price) is broken down at a low pH, losing effectiveness. Field experiments generally confirmed the poor laboratory results with this decontamination method although these experiments have have not been completed.

419

Pesticide Mobility in Soils. 1. Parameters of Thin-Layer Chromatography

Helling, C.S.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

Soil Sci. Soc. Amer., Proc.(SSSAA8), 35(5), 732-7; 1971

CHROMATOGRAPHY; SOILS; HERBICIDES; PESTICIDES; THIN LAYER CHROMATOGRAPHY; MOBILITY; MOVEMENT; WATER; 2,4-D; ATRAZINE; EXTRACTION

Pesticide movement in soil was studied by the thin-layer chromatogrpahic method of C.S. Helling and B.C. Turner (1968). The mobility, expressed as rf values for frontal movement was insensitive to the removal of coarse or medium sand, movement distance, soil layer thickness, temperature, and sample size (0.3-50 microgram). Water flux was modified by amendment. Increased flux may slightly increase pesticide mobility. The mobilities of 2,4-D and atrazine decreased in greater than 0.5 m NACL. Distance to the wetting front on soil thin-layer chromatographic plates was linearly related to the square root of time. Autoradiography, radiochromatogram scanning and zonal extraction were compared as methods for visualizing radioactive pesticide movement.

420

Pesticide Mobility in Soils. 3. Influence of Soil Properties

Helling, C.S.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

Soil Sci. Soc. Amer., Proc.(SSSAA8), 35(5), 743-8; 1971

PESTICIDES; MOVEMENT; SOILS; CHROMATOGRAPHY; THIN LAYER CHROMATOGRAPHY; ADSORPTION; CLAY; DICAMBA; SIMAZINE; PICLORAM; FENAC; 2,4-D; PH; WATER; MOVEMENT

Soil parameters influencing pesticide movement were isolated using simple correlation and multiple linear regression analysis. Mobilities of 12 pesticides on 14 soils were first characterized by soil thin-layer chromatography. Mobility of nonionic compounds were inversely related to adsorption of similar compounds field moisture capacity, organic matter and clay contents, and cation-exchange capacity. Mobility of acidic compounds, such as dicamba, picloram, fenac, and 2,4-D, was directly correlated with soil pH and inversely with picloram adsorption. Pesticide mobility was directly related to increased water flux. When soils were grouped according to their clay mineralogy, there was a tendency for movement of acidic pesticides to be directly related to montmorillonitic clay content. Regression equations usually contained field moisture capacity, water flux, and often simazine and chloropropham adsorption terms for predicting movement. These parameters were highly correlated with soill organic matter the average deviation of predicted from observed mobility, across all soils and pesticides, was 0.04 rf units.

421

Movement of S Triazine Herbicides in Soils

Helling, C.S.

Part of Gunther, F.A. (Ed.), Residue Reviews, Vol. 32, Triazine Herbicides, Symposium, Springer-Verlag, New York, NY 1970. Heidelberg, West Germany, (p. 175-210) 413 p.; 1970

VERTICAL LEACHING; LEACHING; MOVEMENT; SOILS; TRIAZINE; HERBICIDES; S-TRIAZINE

422

Pesticide Mobility in Soils. 2. Applications of Soil Thin-layer Chromatography

Helling, C.S.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

Soil Sci. Soc. Amer., Proc.(SSSAA8), 35(5), 737-43; 1971

PESTICIDES; SOILS; CHROMATOGRAPHY; CLAY LOAM; LOAM; THIN LAYER CHROMATOGRAPHY; ESTERIFICATION; METHYL; DIFFUSION; VOLATILIZATION; HERBICIDES; MOVEMENT; 2,4-D; ATRAZINE; PROPANIL; 2,4,5-T; CHLORPROPHAM; PROPHAM; METHYLCARBAMATE; FENAC; KOALINITE; METABOLITES; SILT; SOIL MOISTURE

Forty pesticides were grouped into 5 categories based on relative mobilities on Hagerstown silty clay loam plates, using thin-layer chromatography. Diffusion was also studied in moist and air-dry soils. Methyl esterification reduced mobility of herbicides, while increasing diffusion and volatility increased 2,4-D movement. Metabolites of atrazine, Propanil, and 2,4-D were less mobile than their paretn compounds. Two chlorinated dibenzo-p-dioxins, potential 2,4,5-T impurities, were immobile. Movement of components in chlorporpham Propham p-chlorophenyl methylcarbamate, and atrazine propachlor combinations were mutually independetn. Dicamba and fenac rf values were directly related to soil pH at 5-6.7. Chlorporpham and propham mobilities were increased by removal of organic matter. Diphenamide showed little mobility in oxidized soil, was immobile in Ca montmorillonite, and was moderately mobile in kaolinite.

423

Chlorodioxins in Pesticides, Soils, and Plants

Helling, C.S.; Isensee, A.R.; Woolson, E.A.; Ensor, P.D.; Jones, G.E.; Plimmer, J.R.; Kearney, P.C.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md

J. Environ. Qual.(JEVQAA), 2(2), 171-8; 1973

REVIEW; CHLORODIBENZODIOXIN; PESTICIDES; CHLORODIOXIN; ANALYSIS

A review with 39 references the sources and toxicology of 2,3,7,8-tetrachlorodibenzo-p-dioxin and other chlorodioxins present as toxic impurities in certain pesticides, the relation of 2,3,7,8-tetrachlorodibenzo-p-dioxin to 2,4,5-T, and pesticide analyses and soil-related environmental studies of 2,3,7,8-tetrachlorodibenzo-p-dioxin are discussed.

424
Algae Bioassay Detection of Pesticide Mobility in Soils

Helling, C.S.; Kaufman, D.D.; Dieter, C.T.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

Weed Sci. (WEESA6), 19(6), 685-90; 1971

CHROMATOGRAPHY; BIOASSAY; PESTICIDES; MOBILITY; SOILS; HERBICIDES; MOVEMENT; THIN LAYER CHROMATOGRAPHY; LEACHING; CLAY LOAM; LOAM; INSECTICIDES; PHENYLUREA; S-TRIAZINE; DIQUAT; PARAQUAT

Movement of pesticides on soil thin-layer chromatography plates was detected by a bioassay employing CHLORELLA SOROKINIANA. After leaching the soil chromatographic plates with water, a C. SOROKINIANA suspension in an enriched agar medium was aspirated onto the soil. The plates were incubated at 100% relative humidity and 30 degrees. Zones of pesticide movement were visible within 24-48 hours mobility in silty clay loam was assessed for 2 methylcarbamate insecticides and for 9 phenylurea, 11 s-triazine and 13 miscellaneous herbicides. For analogous triazines, the motility depended on the substituent and was in the order: one greater than Cl greater than sme. The movement of diquat and paraquat, normally immobile in soils, was directly proportional to the dose, when applied at high doses.

425
Behavior of Pesticides in Soils

Helling, C.S.; Kearney, P.C.; Alexander, M.; Agric. Res. Serv., Beltsville, MD

Advan. Agron. (ADAGA7), 23, 147-240; 1971

REVIEW; PESTICIDES; SOILS; HERBICIDES; INSECTICIDES; ACARICIDES; FUNGICIDES; UPTAKE; PERSISTENCE; PLANTS

The behavior of pesticides in soils is discussed from the standpoint of physicochemistry and metabolic processes affecting pesticides, the effect of pesticides on the soil microbiota, and the implications of these processes on the bioactivity, plant uptake, and persistence of pesticides in soils. (469 references)

426
Pesticide Mobility: Determination by Soil Thin-Layer Chromatography

Helling, C.S.; Turner, B.C.

Science, 162, 562-563; 1968, November

MOBILITY; THIN LAYER CHROMATOGRAPHY; SOILS; PESTICIDES

427
Persistence of Benomyl in Different Soil Types and Microbial Breakdown of the Fungicide in Soil and Agar Culture

Helweg, A.; Bakteriol. Afd., Statens Planteavls-Lab., Denmark

Tidsskr. Planteavl (TPLAAV) 1973, 77(2) 232-43; 1973

BENOMYL; SOILS; BACTERIA; FUNGICIDES; TRANSFORMATION; AUTOCLAVING; IRRADIATION; HUMUS; METHYL 2-BENZIMIDAZOLECARBAMATE; BIOASSAY; CARBON; NITROGEN; BREAKDOWN

The fungistatic effect of benomyl in soil was due to its breakdown product methyl 2-benzimidazolecarbamate. The decrease of the fungistatic activity was related to microbial activity and soil type. Benomyl added to soil was very rapidly converted into methyl 2-benzimidazolecarbamate. Benomyl (100 ppm) was added to untreated, autoclaved, or gamma irradiated soil. Thus, by the penicillium bioassay, after 52 days of incubation, the untreated soil showed 50% of the original fungistatic effect, whereas autoclaved or irradiated soil showed 80%. For various soils, the loss of fungistatic activity increased with humus content. Microorganisms isolated from benomyl-treated soil, utilized benomyl as a carbon and nitrogen source on agar plates.

428
Chlorfenvinphos. Persistence and Influence on Nitrogen Metabolism in Soil

Helweg, A.; Statens Planteavls-Laboratorium, Lyngby, Denmark

Tidsskr. Planteavl (TPLAAV) 1972, 76(4) 519-27; 1972

CHLORFENVINPHOS; INSECTICIDES; PERSISTENCE; SOILS; AMMONIFICATION; NITRIFICATION; METABOLISM; SOIL MOISTURE

Technical chlorfenvionphos and pure alpha- and beta- isomers were incubated with sterile and non-sterile soil at 25 degrees C and 15% soil moisture. Chlorfenvionphos was much more persistent in sterile soil than in non-sterile soil and the beta-isomer was more persistent than the alpha-isomer (20% and 40% of the alpha- and beta-isomers, respectively, remained from 100 ppm technical chlorfenviophos after incubation for 170 days). Ammonification was not significantly reduced by 1000 ppm chlorfenvinphos. Nitrification was almost completely inhibited by 1000 ppm chlorfenvinphos but was not affected by 10 or 100 ppm.

429
Microbial Breakdown of the Fungicide Benomyl

Helweg, A.; Dep. Bacteriol., State Lab. Soil Crop Res., Lyngby, Den.

Soil Biol. Biochem. (SBIOAH) 1972, 4(3), 377-388; 1972

SOILS; MICROBIOLOGY; BENOMYL; FUNGICIDES; DEGRADATION; DECOMPOSITION; BREAKDOWN; LOAMY; FUNGI

Four strains of bacteria and 2 fungi, which decomposed. Benomyl to nonfungistatic compounds were isolated from loamy garden soil after 2 months of incubation at 25 degrees.

430
Persistence of Maleic Hydrazide in Soil and Its Effect on Release of Carbon Dioxide

Helweg, A.

Tidsskrift for Planteavl, 75(1), 84-89

MALEIC HYDRAZIDE; DECOMPOSITION; PERSISTENCE; SOILS; MICROBES; INOCULATION

In laboratory experiments in which 100 ppm of maleic hydrazide was added to garden soil, microbial decomposition decreased the concentration of the hydrazide to 5 ppm in 3 weeks. The rate of decomposition was not increased by inoculation with soil to which maleic hydrazide had previously been applied. CO2 release by soil was increased by maleic hydrazide, especially when wheat straw was also added. Inoculation with soil previously treated with the hydrazide did not increase stimulation of CO2 release by the hydrazide. In a field experiment in which 5 and 10 kg/ha of active ingredient were applied, 90% of the maleic hydrazide disappeared within 12 days and only traces occurred after 80 days; the hydrazide did not occur below 10 cm.

431
Persistence of Napropamide and U-27267
3,4,5-Tribromo-N N A-Trimethylpyrazole-1
Acetamide in a Sandy Loam Soil

Henne, R.C.

Proc. Northeast Weed Sci. Soc. 28, 140-144; 1974

HERBICIDES; STUNTED; SOILS; GROWTH; PERSISTENCE; ACETAMIDE; SANDY LOAM; NAPROPAMIDE

432
Installment Application Effects upon Insecticide Residue Content of a California Soil

Hermanson, H.P.; Gunther, F.A.; Anderson, L.D.; Garber, M.J.; California University, Riverside, Ca

J Agric Food Chem., 19(4), 722-726; 1971

LINDANE; DDT; TOXAPHENE; CHLORDANE; DIELDRIN; ENDRIN; ALDRIN; HEPTACHLOR; FOOD CONTAMINATION; INSECTICIDES; RESIDUES; SOILS; SAND; CLAY; PERSISTENCE

Toxaphene, DDT, chlordane, endrin, dieldrin, heptachlor, aldrin and lindane were applied annually to a Holtville sandy clay for 5 years at rates of 20, 20, 10, 5, 5, 5, 5, and 1 lb/acre, respectively, and sampling was continued for 6 years after the final application. Residues were determined from total organically bound Cl content of the soil. All insecticide applications except that of lindane resulted in significant residues in the soil. A persistent Cl index, in which no degradation or other disappearance during the first year was given the value 1.0, gave values of 0.26, 0.22, 0.20, 0.18, 0.14, 0.13 and 0.09 for DDT, dieldrin, endrin, toxaphene, heptachlor, chlordane and aldrin, respectively.

433
What Is Cycloate

Herve, J.J.; Roa, L.; Soc. Procida, Fr.

Def. Veg.(DEVEAA) 1972, 26(153) 30-4; 1972

REVIEW; CYCLOATE; HERBICIDES; CARBAMATE

A review with 3 references of the toxicity, mechanism of action, soil polluting properties, and selectivity of the herbicide, cycloate.

434
DDT and Other Insecticides in Berlin Soils

Herzel, F.; Inst. Wasser-, Boden- Lufthyg., Bundesgesundheitsamtes, Berlin, Ger.

Z. Kulturtech. Flurbereinig.(ZKUFAK) 1971, 12(5) 306-11; 1971

ORGANOCHLORINE INSECTICIDES; SOILS; INSECTICIDES; DDT; DDE; HEPTACHLOR; ALDRIN; HEPTACHLOR EPOXIDE; DIELDRIN

Amounts of less than 1 ppm gamma-HCH, DDT, and DDE were found frequently in West Berlin soil samples. Alpha-HCH, heptachlor, aldrin, heptachlor epoxide, and dieldrin were found less frequently.

435
Insecticides

Hill, I.R.; ICI Plant Protection Ltd., Jealott's Hill Res. Station, Bracknell, Berkshire, England

J. Appl. Chem. Biotechnol., 22(7), 879; 1972

LEACHING; VOLATILIZATION; UPTAKE; DEGRADATION; METABOLISM; ADSORPTION; REMOVAL; SOILS; INSECTICIDES; OXIDATION; HYDROLYSIS; DEHALOGENATION; REDUCTION; DEHYDRATION; COMETABOLISM; REVIEW; PLANTS

Leaching, volatilization, plant uptake and metabolism, and chemical and microbial degradation, as well as adsorption on soil colloids contribute to the removal of insecticides from soil. Relatively few biochemical reactions are involved in insecticide metabolism. These include oxidation, hydrolysis, dehalogenation, reduction, dehydration, and cometabolism. Most studies on insecticide degradation are inadequate due to their lack of applicability to field conditions.

436
Fate of Zinc Phosphide and Phosphine in the Soil-Water Environment

Hilton, H.W.; Robinson, W.H.; Exp. Stn., Hawaii. Sugar Plant. Assoc., Honolulu, Hawaii

J. Agr. Food Chem.(JAFCAU) 1972, 20(6) 1209-13; 1972

ZINC PHOSPHIDE; SOILS; WATER; PHOSPHINE; HYDROLYSIS; RODENTICIDE; DECOMPOSITION; FOOD CHAINS; PESTICIDES; FATE; PHOSPHINE; CROPS; PLANTS; SOIL-WATER ECOSYSTEM

Factors affecting the changes of phosphide, contained in a rodenticide, to phosphine and then to phosphate are examined.

437
Transport of Organic Insecticides to the Aquatic Environment

Hindin, E.; Bennett, P.J.; Washington State University, Pullman, Wash.

Advan. Water Pollut. Res., Proc. Int. Conf., 5th (24JNA8), 2, III-19, 1-16; 1971

TRANSPORT; INSECTICIDES; ORGANOCHLORINE INSECTICIDES; SOILS; IRRIGATION; DDT; ETHION

438
Evaluation of Benomyl for the Control of Dutch Elm Disease

Hock, W.K.; Schreiber, L.R.

Plant Dis Rep 55 (1). 1971 58-60

FUNGICIDES; IMMOBILIZATION; SOILS; BENOMYL; ELM; DUTCH ELM; DISEASE

439
Effect of Time of Irrigation on the Distribution of 1,2-Dibromo-3-Chloropropane in Soil After Shallow Injection

Hodges, L.R.; Lear, B.

Pestic. Sci., 4(6), 795-799; 1973

PESTICIDES; DOWNWARD MOVEMENT; MOVEMENT; SOILS; IRRIGATION; 1,2-DIBROMO-3-CHLOROPROPANE; DISTRIBUTION

440
Lipid Deposition on Leaves of Canada Thistle Ecotypes

Hodgson, J.M.

Weed Sci 21 (3). 1973 169-172

2,4-D; RESISTANCE; HERBICIDES; SUSCEPTIBILITY; WIND MOVEMENT; EVAPORATION; LEAF AGE; SOILS; THISTLES; LIPIDS

441
Trifluralin Interations with Soil Constituents

Hollist, R.L.; Foy, C.L.

Weed Sci 19 (1). 1971 11-16

X-RAY DIFFRACTION; HERBICIDES; PHYTOTOXICITY; ADSORPTION; TRIFLURALIN; SOILS

442
Study of Arsenate Sorption on Soils. 2. Magnitude of Adsorption in Relation to Time and Amorphous Hydrated Oxides of Aluminium and Iron

Holobrady, K.; Galba, J.

Pol'nohospodarstvo, 16, 575-581; 1970

ARSENATE; SORPTION; SOILS; ADSORPTION; PH; IRON HYDROXIDES; ALUMINUM HYDROXIDES

The rate of adsorption was exponential. In slightly acid and neutral soils, the adsorption rate was increased by the presence of hydrated oxides of iron and aluminum.

443
Surface Water Quality is Influenced by Agriculture Practices

Holt, R.F.; Univ. Minnesota, Morris, MN

Trans. ASAE (Amer. Soc. Agr. Eng.) 16(3): 565-568; 1973

PESTICIDES; HALF-LIFE; ORGANOCHLORINES; DIELDRIN; RUNOFF; DDT; DEGRADATION; PERSISTENCE; TRIAZINE AGRICULTURE; SURFACE WATER; WATER; SOIL CONSERVATION; FERTILIZER; ANIMAL WASTES; HEAVY METALS

The impact of agriculture on water quality depends to a larger degree on the practice of soil conservation since soil is the primary recipient of fertilizers, animal wastes, and pesticides. Most pesticides have a strong affinity for soil, and many persist in the environment. The approximate half-life for pesticides in soil has been suggested to be 1-2 years for the triazines, 2-4 years for the organochlorines, and up to 30 yr for the heavy metals. Losses of substances like dieldrin due to runoff occur primarily during the year of application, but these are only small portion of the total loss. Anaerobic conditions such as are found in runoff enhance degradation of DDT. Highly selective chemicals of low persistence should, however, be developed in order to ensure a reduction in the hazards of water pollution from agricultural land drainage. (34 references)

444
Present State of Soil Insect Pest Control

Homeyer, B.

Pflanzenschutz-Nachr., 23(3), 224-230; 1972

CHLORINATED HYDROCARBONS; FUMIGANTS; INSECTICIDES; RESISTANCE; INSECTS; PERSISTENCE; FENSULFOTHION; PHOXIM; ORGANOPHOSPHATES; ALDRIN; PHOXIM; MAMMALS; RATS

Chlorinated hydrocarbons replaced fumigants as soil insecticides because of easier application and better control. These are being replaced at present because of the development of resistance to them among insects and their persistence in the environment. Fensulfothion and phoxim are two new organophosphates which look promising as soil insecticides. Both compounds control a wide range of insects formerly controlled by the chlorinated hydrocarbons. They were found to have better penetration in soil than aldrin and to persist under laboratory conditions for about 4 months and under field conditions for 2.5 to 3 months, phoxim is much less toxic to mammals, having an oral LD50 in male rats of 2066 mg/kg compared to an oral LD50 of between 4 and 10 mg/kg for fensulfothion. (7 references)

445
Biological Determination of Aldrin Residues in the Soil After Application of Superphosphate with Aldrin

Homonnay Csehi, M.E.; Res. Inst. Plant Prot., Budapest, Hung.

Kiserletugyi Kozlem., A(KKANAM) 1971, 62(1-3) 185-93; 1971

ALDRIN; SOILS; RESIDUES; LOESS-SANDY

As shown by the DROSOPHILA test, the toxicity of soils treated with 2% aldrin containing superphosphate (100 or 200 kg/1.42 acre) decreased hyperbolically with time. The toxicity disappeared 980 days after the treatment. Loess-sandy soils were more toxic than brown forest soils, for the same amount of aldrin incorporated.

446
The Movement and Description of Fluometuron in Norge Loam Soil.

Hornsby, A.G.; Oklahoma State University, Stillwater, OK

Thesis, Oklahoma State University, Stillwater, University Microfilms Order No. 73-1544; 1973

ADSORPTION; DESORPTION; MOVEMENT; AGGREGATE SIZE; FLUOMETURON; LOAM; SOILS; HERBICIDES; PORE-WATER VELOCITY; MATHEMATICAL MODEL; MODEL

Pore-water velocity, adsorption, desorption, and aggregate size influenced the movement of fluometuron in Norge loam soil. Faster pore-water velocities prevented establishment of equilibrium adsorption between the herbicide and the soil in the column. Adsorption took place rapidly when batch adsorption techniques were used. Aggregate size affected the effluent concentration distributions because of changes in the available soil particle surface for reaction and pore-water flow properties. Two existing mathematical models tested using the data did not accurately predict the concentration distributions obtained.

447
Solution and Adsorbed Fluometuron Concentration Distribution in a Water-Saturated Soil. Experimental and Predicted Evaluation

Hornsby, A.G.; Davidson, J.M.; Dept. of Agronomy, Oklahoma State Univ., Stillwater, OK

Soil Sci. Soc. Amer., Proc. (SSSAA8), 37(6), 823-8; 1973

HERBICIDES; ADSORPTION; DESORPTION; SOILS; FLUOMETURON; MATHEMATICAL MODEL; MODEL; DISTRIBUTION COEFFICIENT

The solution and adsrobed phases of fluometuron in a water-saturated soil column were in equilibrium at an average pore-water velocity of 0.59 cm/hr. The kinetic rate equations for adsorption and desorption were not significantly better than the equilibrium model when describing the fast displacement of iodine through soils. The desorption distribution coefficient was a function of the maximum amount of herbicide adsorbed prior to desorption. The experimental data were reasonably well described by the mathematical model.

448
Ecology of Herbicides Under Irrigated Subtropical Conditions

Horowitz, M.; Div. Weed Res., Volcani Inst. Agric. Res., Haifa, Israel

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAay) 1972, 6, 101-15; 1972

REVIEW; HERBICIDES; DEGRADATION; SOILS; IRRIGATION; WATER

A review with 74 references. The factors which influence the bioactivity and degradation of herbicides in warm, irrigated soil are discussed.

449
A Rapid Bioassay for Diphenamid and its Application in Soil Studies

Horowitz, M.; Hulin, N.

Weed Res 11(2-3), 143-149; 1971

BIOASSAY; DIPHENAMID; SOIL STUDIES; OATS-M; HERBICIDES; BIOACTIVITY; SLURRY METHOD; ADSORPTION; RELEASE; SOILS

450
Microbial Co-Metabolism and the Degradation of Organic Compounds in Nature

Horvath, R.S.

Bacteriol. Rev., 36(2), 146-155; 1972

SOILS; LAKES; DEGRADATION; PESTICIDES; OXIDATION; DDT; 2,4,5-T; WATER; HERBICIDES; 2,3,6-TBA; WATER

The degradation of organic compounds such as pesticides in nature can be accomplished by microbial cometabolism , the oxidation of substances without utilizing energy derived from oxidation to support microbial growth. Unsuccessful attempts have been made to isolate organisms capable of utilizing compounds like DDT and 2,4,5-T as sole sources of carbon and energy for growth. However, cometabolism of these materials has occurred in the laboratory. The process does not result in complete mineralization of the molecule, but it does eliminate the toxicity. By the action of several species, complete degradation can sometimes be accomplished. Field studies are needed in this area to establish the susceptibility of these substances to degradation in soil and water. The degradation of the herbicide 2,3,6-TBA was accomplished by microbial populations present in lake water under laboratory conditions without a significant increase in microbial growth. Application of the term recalcitrant to pesticides such as DDT and 2,3,6-TBA may be the result of fallible procedures which do not consider the cometabolism phenomenon, rather than the inactivity of the microorganisms. (58 references)

451

Effect of Atrazine in Combination with Captan or Thiram Upon Fungal and Bacterial Populations in the Soil

Houseworth, L.D.; Tweedy, B.G.; Dept. Plant Pathol., Univ. Missouri, Columbia, MO 65201

Plant Soil, 38, 493-500; 1973

CAPTAN; THIRAM; SOILS; CORN; WHEAT; BEANS; FUNGI; ATRAZINE; PLANTS; DECAY; FUNGICIDES; HERBICIDES

Captan and thiram added at a rate of 10 mg/kg to soil subsequently planted with corn, wheat, or beans initially decreased fungal populations in greenhouse experiments. Populations almost normalized after 108 days. When atrazine was added at a rate of 10 mg/kg to soil planted with corn, the corn and microbial populations were not affected. However, atrazine added to soil planted with wheat or beans susceptible to it stimulated microbial growth, which could be attributed to the increase in decay of dead plant material. Synergistic or antagonistic effects were not observed when the fungicides and herbicides were applied in combination. (12 references)

452

Interaction of Pesticide-Derived Chloroaniline Residues with Soil Organic Matter

Hsu, T.; Bartha, R.

Soil Science, 116(6), 444-453; 1973, December

CHLOROANILINES; RESIDUES; ABSORPTION; HERBICIDES; PERSISTENCE; SOILS

Herbicide-derived chloronailine residues are immobilized by physical absorption to both the organic and the inorganic soil fraction and by chemical binding to the soil organic matter. Chloroaniline binding is strictly a physiochemical process with microbial activity involved only in liberation from the parent herbicides. Two mechanisms hydrolyzable (anil and anilinoquinone) and nonhydroloyzable (heterocyclic rings and ether bonds) immobilized roughly equal amounts of chloroanilines in the test soil. Chloroaniline binding greatly increased the persistence of these herbicide derivatives in the environment.

453

Fate or Organic Pesticides in the Aquatic System

Huang, J.C.; Dep. Civ. Eng., Univ. Missouri, Rolla, Mo.

Eng. Bull. Purdue Univ., Eng. Ext. Ser.(PEESAO) 1970, No. 137(Pt. 1) 449-57; 1970

REVIEW; PESTICIDES; WATER; FATE; VOLATILIZATION; DECOMPOSITION; DEGRADATION; ADSORPTION; DESORPTION

A review with 27 references on the fate of pesticides in water. Volatilization, decomposition by ultraviolet irradiation, microbial degradation, biological magnification, and adsorption onto and description from suspended matter are discussed.

454

Water-Sediment Distribution of Chlorinated Hydrocarbon Pesticides in Various Environmental Conditions

Huang, J.C.; Department of Civil Engineering and Environmental Research Center, University of Missouri - Rolla, MO

International Conference on Transport of Persistent Chemicals in Aquatic Ecosystems, Ottawa, Canada, May 1-3, 1974, University of Ottawa, National Research Council Laboratories, National Research Council of Canada, Environment Canada, p. 4; 1974, May

DISTRIBUTION; CHLORINATED HYDROCARBON PESTICIDES; DDT; DIELDRIN; HEPTACHLOR; CLAY; HUMIC ACID; ADSORPTION RATE; DISTRIBUTION; PH; SALT; SORPTION; DESORPTION; AQUATIC MODEL; LAKES; PESTICIDES; UPTAKE; RELEASE; AQUATIC ECOSYSTEMS; WATER; SEDIMENTS; CHLORINATED HYDROCARBONS; ADSORPTION

The water-sediment distributions of three selected chlorinated hydrocarbon pesticides (DDT, dieldrin, and heptachlor) in various aquatic systems containing clay minerals and/or humic acids were investigated. Emphasis was placed on the study of adsorption rate, mechanisms, and equilibrial distribution. The effect of several important environmental factors including pH, temperature, salt(NaCl) content, and different representative organic pollutants on the pesticide sorption and desorption was also determined. The experimental systems which were employed in this study include both the closed, complete-mix, batch system, and the open, continuous-flow aquatic model system. The closed system was used to evaluate basic mechanisms of adsorption and desorption and their reaction rates. The continuous-flow aquatic model was designed to simulate certain specific field conditions that actually exist in lakes and was used to ascertain the effect of the selected environmental factors on the uptake and release of pesticides by the selected adsorbent. Results of this study reveal that the adsorption of pesticides by clay minerals involves the formation of some strong chemical bondings in addition to the weak force of physical attraction. The rates of adsorption and desorption are dependent upon each specific pesticide-adsorbent combination. In most cases, desorption only occurs to limited extents, which tend to maintain a certain equilibrial water-sediment distribution for each pesticide-clay combination. It is interesting to note that none of the selected environmental factors appear to exert any significant influence on the pesticide uptake and release by the aquatic sediment minerals.

455

Adsorption of Pesticides by Clay Minerals

Huang, J.C.; Liao, C.S.; Dept. Civ. Eng., Univ. Missouri, Rolla, MO

J. Amer. Soc. Civ. Eng., 96(SA5), 1057-1076; 1970

ADSORPTION; PESTICIDES; CLAY; DDT; DIELDRIN; HEPTACHLOR; DESORPTION; DEPOSITION; DIFFUSION; EQUILIBRIUM

DDT, dieldrin, and heptachlor were adsorbed readily on clay minerals, a major portion of the equilibrium amount on expansible clays being adsorbed within several minutes. Equilibrium was reached within one hour in the case of DDT while a definite desorption of dieldrin began to take place after several minutes. DDT and heptachlor were adsorbed more gradually on an expansible clay, and two distinct stages--deposition on the surface and gradual diffusion into the interlamellar spaces--were observed. DDT and heptachlor are primarily adsorbed through hydrogen bonding; dieldrin adsorption can be attributed mostly to strong interaction between the dieldrin epoxide ring and the oxygen on the clay minerals. Adsorptive capacities of the clay minerals used did not correlate with their ion exchange capacities or specific surface areas. The results have demonstrated that clays may be useful as carriers or diluents of pesticides in agricultural applications. Studies on the efficacy and on prevention of runoff would have to be carried out to determine their usefulness. (12 refs)

456

Adsorption of Pesticides on Clay Minerals

Huang, J.C.; Liao, C.S.

Trans. Mo. Acad. Sci., 3, 103; 1969

DDT; ADSORPTION; PESTICIDES; CLAY; MINERALS

457

Sorption and Desorption of Chlorinated Hydrocarbon Pesticides in Aquatic Sediment Minerals

Huang, J.C.; Liao, C.S.; Chien, F.S.; Chiang, L.T.; Missouri Water Resour. Res. Cent., Role, Mc.

U. S. Nat. Tech. Inform. Serv., Pb Rep.(XPBBCA) 1971, (No. 204706,) 16 Pp.; 1971

CHLORINATED HYDROCARBON PESTICIDES; ADSORPTION; CLAY; HUMUS; WASTE TREATMENT; SLUDGE; SORPTION; DESORPTION; PH; SALT; ORGANOCHLORINE PESTICIDES; SEDIMENTS; WASTE TREATMENT; AGRICULTURE

The fundamental sorption and desorption reactions between selected chlorinated hydrocarbon pesticides and clay minerals were established. The effects of several environmental factors, including pH, temperature, salt (NaCl) concentration, and organic matter content, on the sorption and desorption were also ascertained. The organochlorine pesticides were rapidly absorbed by clays and also retained strongly after adsorption. Only small fractions of the adsorbed pesticides could be desorbed. The pH, temperature, salt content, and organic pollutants had little effect on the sorption and desorption. However, the organic humus present in the sediment phase was able to enhance the pesticide adsorption because chlorinated hydrocarbon pesticides were adsorbed in much greater quantities by organic humus than by clay minerals. It seems that waste-treatment sludge can be used as a pesticide carrier or diluent for agricultural applications.

458

Effect of Selected Factors on Pesticide Sorption and Desorption in the Aquatic System

Huang, J.C.

J. Water Pollution Control Federation, 43(8), 1739-48; 1971

ADSORPTION; WATER; DESORPTION; DDT; DIELDRIN; HEPTACHLOR; MONTMORILLONITE; ILLITE; PH; TEMPERATURE; SALT; GLUCOSE; ANALINE; STEARIC ACID; WASTES; DISTILLED WATER; SALT; PESTICIDES; CLAY

The effects of various water variables on the adsorption and desorption of DDT, dieldrin and heptachlor by montmorillonite and illite were studied in laboratory aquatic systems. The factors investigated were pH, temperature, salt(NaCl) concentration and organic pollution (represented experimentally by glucose, analine, stearic acid and the soluble organic complexes in filtered, domestic waste water). In the first series of experiments, the effects of pH (6.0, 8.0 and 10.0), temperature (10, 20 and 30 C) and salt concentration (0.03, 0.3 and 3.0% by weight) on the adsorption and desorption of dieldrin by montmorillonite was determined. Dieldrin in aqueous solution (100 mcg/l) was added to aquariums containing a bottom layer of montmorillonite. Water was taken from residue analysis from 24 to 36 hours as a measure of adsorption. After 48 hours, the water was siphoned off and distilled water was added. During the next 24 hours, this water was analyzed for dieldrin as a measure of desorption. With decreasing pH, the adsorption of dieldrin increased slightly and decreasing amounts were released back into solution. Adsorption and desorption were not significantly affected by changes in the water temperature. Slightly more dieldrin was absorbed and retained more strongly at a salt content of 3% than at 0.3 or 0.03%; however, more was adsorbed and retained at a salt concentration of 0.03% than at 0.3%. The influence of the organic matter on the adsorption rates and equilibria of the three pesticides by the two clays was studied in bottles. The test solutions were stirred or agitated and then centrifuged. The liquid solution was analyzed for residual pesticides. Glucose, alanine and stearic acid at various concentrations did not influence the rates and equilibria of adsorption of the pesticides by the two clays. Dieldrin adsorption by montmorillonite was not influenced by the soluble organic matter contained in filtered, domestic waste water. (19 references)

459

Microbiological Effects and Persistence of some Pesticide Combinations in Soil

Hubbell, D.H.; Rothwell, D.F.; Wheeler, W.B.; Tappan, W.B.; Rhoads, F.M.

J. Environ. Qual., 2 (1), 1973, 96-99

BACTERIA; ACTINOMYCETES; FUNGI; ZINEB; FUNGICIDES; PARATHION; DDT; INSECTICIDES; FURADAN; NITRIFICATION; PERSISTENCE; SOILS

460

Adsorption and Mobility of Pesticides in Soil

Huggenberger, F.; Letey, J.; Farmer, W.J.; Div. Agric. Sci., Univ. California, Berkeley, Ca

Calif. Agr.(CAGRA3), 27(2), 8-10; 1973

PESTICIDES; MOBILITY; SOILS; ADSORPTION; MODEL; DISTRIBUTION; DIURON; ATRAZINE; LINDANE; TRANSPORT

A mathematical model was developed which predicts the distribution of pesticides such as diuron and atrazine, and lindane in soil profiles, and this model was evaluated by comparing results with results obtained from laboratory experiments. It was not always possible to predict the depth of the maximum concentration of the pesticides accurately, but the adsorption coefficient gave a qualitative indication of the relative mobility of the pesticides in the soils.

461

Effect of Two Nonionic Surfactants on Adsorption and Mobility of Selected Pesticides in a Soil System

Huggenberger, F.; Letey, J.; Farmer, W.J.

Soil Sci. Soc. Am. Proc., 37(2), 215-219; 1973

LINDANE; DIURON; ATRAZINE; MASS TRANSPORT; LEACHING; TRANSPORT; SOILS; ADSORPTION; PESTICIDES

462

Observed and Calculated Distribution of Lindane in Soil Columns as Influenced by Water Movement

Huggenberger, F.; Letey, J.; Farmer, W.J.; California University, Riverside, Ca

Soil Sci. Soc. Am. Proc., 36 (4), 1972, 544-548

TRANSPORT; LEACHING; LINDANE; DISTRIBUTION; WATER; PENETRATION;; SOIL COLUMNS

The observed and calculated distributions of lindane in soil columns were compared using 3 mineral soils with different organic matter contents and particle size distributions. As predicted by the theory, application of greater amounts of lindane increased the concentration but did not influence its depth of penetration. Under leaching conditions, the depth of maximum concentration of lindane could be determined by depth of water penetration divided by K. The shape of the distribution curve was unpredictable.

463

Formation of Tetrachloroazobenzene in Some Canadian Soils Treated with Propanil and 3,4-Dichloroaniline

Hughes, A.F.; Corke, C.T.; Res. Lab. of Food and Drug Directorate, Dept. Nat. Health and Welfare, Ottawa, Ontario, Canada

Can. J. Microbiol., 20(1), 35-39; 1974

TETRACHLOROAZOBENZENE; PROPANIL; SOILS; PH; ORGANIC MATTER; CLAY; SAND; LOAM; AZOBENZENE; 3,4-DICHLOROANILINE; MARSH; SILT

The formation of 3,3',4,4'-tetrachloroazobenzene from the herbicide propanil and from 3,4-dichloroaniline was studied in nine soils which varied in pH, percentage of organic matter, clay, and sand. Marked differences were observed in these soils in the amounts of azobenzene formed. In five soils whose pH values fell within a range of pH 4.5 to 5.5, azobenzene was produced from both substrates, while in two soils (Guelph loam and Wendigo loamy sand), azobenzene was only detected from 3,4-dichloroaniline. No azobenzene was detected from either substrate in two additional soils, (Belleisle marsh soil (site 22, pH 3,4) and Fiz silt loam (pH 6.4). Air-drying soils, as well as extended periods of storage of freshly collected soils at 4 degrees C, reduced the formation of azobenzene. (16 references)

464

Movement and Persistance of Picloram in Soil

Hunter, J.H.; Stobbe, E.H.; Plant Sci. Dep., Univ. Manitoba, Winnipeg, Manitoba

Weed Sci.(WEESA6), 20(5), 486-489; 1972

SOILS; HERBICIDES; MOVEMENT; PICLORAM; AMINOTRICHLOROPICOLINATE; LEACHING

In applying Picloram (35-700 G/HA) to osborne clay soil, the movement and dissipation of picloram were negligible under low soil moisture conditions, but picloram was leached into a depth of 30-60 cm under high rainfall condition. The degree of leaching increased with increasing application rates, and the dissipation increased with increasing temperature and decreased with increasing depth in the soil profile. After 2 applications of picloram (350 G/HA) in 2 successive years, 31% of the activity remained after 2 years.

465

Effect of Electrolytes on the Solubility of some 1,3,5-Triazines and Substituted Ureas and their Adsorption on Soil

Hurle, K.; Freed, V.H.; Dep. Agric. Chem., Oregon State Univ., Corvallis, Oreg.

Weed Res.(WEREAT) 1972, 12(1), 1-10; 1972

HERBICIDES; ELECTROLYTES; SOILS; ADSORPTION; ATRATONE; AMETRYNE; ATRAZINE; FENURON; MONURON; DIURON; SALT; IONIC STRENGTH

The solubility of Atratone, Ametryne, Atrazine, Fenuron, Monuron, and Diuron was depressed by KC1, NH4C1, CaC12, and to a higher degree at ionic strength 0.6 than 0.3. the adsorption of the herbicides to soil was enhanced by the salts.

466

Experiments on the Rate of Decomposition or DNOC in Soils: The Effect of Pre-treatments

Hurle, K.; Pfefferkorn, V.; Abteilung fur Herbologie, Universitat Hohenheim, Stuttgart, German Federal Republic

Proceedings, 11th British Weed Control Conference, 2, 806-810; 1972

RATE; DECOMPOSITION; DNOC; SOILS

Previous treatment of soil with DNOC increased the rate of decomposition of subsequent applications.

467
Studies of the Effect of Long-Term Application of DNOC and 2,4-D on Their Breakdown in the Soil

Hurle, K.; Rademacher, B.

Weed Res., 10(2), 159-164; 1970

CEREAL CROPS; DNOC; 2,4-D; SOILS; HERBICIDES; SANDY LOAM; FILDER-LOAM; RAPHATOX; WATER; RADIOACTIVITY; CHROMATOGRAPHY; ANALYSIS; SOILS

Laboratory studies compared the rate of breakdown of DNOC and 2,4-D in cereal-cropped soils treated for 12 years with these herbicides and in soil treated for the first time. The substrate was a sandy loam (filder-loam). The compounds were applied as raphatox (50% free acid) at 4 kg/ha in 1000 L water and U 46 fluid (2,4-D-dimethylamine salt, 49% freeacid) at 1.5 l/ha in 1000 L water. For 2,4-D in soil, the method of analysis was by radioactivity and chromatography. DNOC analysis was after Hurle (1968). From DNOC-treated fields, soil samples were taken 7 months after the last treatment in the 12th year; samples from 2,4-D-treated fields were taken 6 months after the last application in the 12th year. At the start of the study, the DNOC content of soil in treated fields stood at less than 0.01 ppm. The fate of the two herbicides in percent of the original dose remaining plotted against time is shown in two graphs that compare the breakdown rate in long-treated and untreated soils. In both long-treated and untreated soils, under the conditions of the experiment, the DNOC breakdown proceeded at about the same rate. The breakdown of 2,4-D proceeded with greater speed in long-treated soil than it did in soil that received the compound for the first time. Ten percent of the original dose still remained in long-treated soil on day 11 as compared with 10% on day 15 in the first-time-treated soil. (18 references)

468
Long Distance Transport of Pesticides

Hurtig, H.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. OISO, Japan, October, 971, 637 p. Academic Press: New York, NY, USA; London, England (p. 257-280).; 1972

FISH; INSECTICIDES; SOILS; PERSISTENCE; TRANSPORT; AIR; AQUATIC ECOSYSTEMS; ATMOSPHERIC TRANSPORT

469
Determination of Ametryne and Atrazine Residues in Soil by Thin-Layer Chromatography

Huss, M.; Adamovic, V.M.; Dep. Sanit. Chem., Inst. Public Health Srbia, Belgrade, Yugoslavia

J. Chromatogr.(JOCRAM), 80(1), 137-139; 1973

HERBICIDES; TRIAZINE; AMETRYNE; DETERMINATION; ATRAZINE; SOILS; RESIDUES; URANIN; CARBON DISULFIDE; ETHYL ACETATE; SOLVENTS; ALUMINA; THIN-LAYER CHROMATOGRAPHY

Ametryne and atrazine residues in soil were determined by thin-layer chromatography on alumina to which had been added 0.01% uranin a, a fluorescent dye. The recovery of ametryne and atrazine was 80 and 100%, respectively, with a carbon disulfide-ethyl acetate solvent system. The limit of detection for this method was 0.005 ppm.

470
Oxidative Decomposition of Ethylene-bis-Dithiocarbamates

Hylin, J.W.; Dept. Agr. Biochem., Univ. Hawaii, Honolulu, HI 96822

Bull. Environ. Contam. Toxicol., 10(4), 227-233; 1973

MANEB; DECOMPOSITION; DEGRADATION; ETHYLENE THIURAM DISULFIDE; ETD; OXIDATION; ETHYLENE-BIS-DITHIOCARBAMATES; ETU; ETHYLENE THIOUREA; ETHYLENE THIURAM MONOSULFIDE; ETM; SOILS

Maneb, suspended or dissolved in buffer or exposed to moist soil, decomposed at an increasing rate with the evolution of CS2 until approximately 20% of the CS2 had been released. The decomposition was slower at alkaline pH, and in soil, rather than aqueous suspensions or solutions, and no decomposition took place under nitrogen. Ethylene thiourea (ETU), ethylene thiuram monosulfide (ETM), sulfur, and a trace of either ethylene diamine or unreacted maneb were recovered from the reaction flask. From the results obtained in the study it appears that ETU is formed as a direct result of a more or less spontaneous degradation of ethylene thiuram disulfide (ETD), formed by the oxidation of maneb. If oxygen could be excluded during the storage and use of ethylene-bis-diethiocarbamates, ETD formation might be minimized. (18 references.)

471
The Rate of Degradation of Metribuzin and Two Analogs in Soil

Hyzak, D.L.; Colorado State Univ., Fort Collins, CO

Thesis, Colorado State University, Fort Collins, CO; University Microfilms Order No. 73-13038; 1973

DEGRADATION; METRIBUZIN; SOILS; SAND; LOAM; HALF-LIFE; HERBICIDES; TEMPERATURE EFFECTS

Rates of degradation of metribuzin, BAY-88410 (4-amino-6-isopropyl-3-(methylthio) -as-triazin-5(4H)-one and BAY-86791 (4-amino-6-cyclohexyl-3-(methylthio)-as-triazin-5(4H)-one, applied at 10 ppm in sandy loam soil in the laboratory, were highly temperature dependent. At 5 and 20 degree metribuzin degraded more slowly than its analogs. At 35 degree all three degraded at similar rates, and the limit of detection (0.01 ppm) was reached in 9-10 months. The calculated half-lives for the three compounds at 5, 20, and 35 degree averages 329, 44, and 16 days, respectively. The pattern of herbicide degradation in the field followed that observed in the laboratory. It is expected that laboratory data can be extrapolated to the field.

472
Decomposition of Pentachlorophenol in Paddy Soil

Ide, A.; Niki, Y.; Sakamoto, F.; Watanabe, I.; Watanabe, H.

Agric. Biol. Che., 36 (11), 1972 (Recd 1973), 1937-1944

RICE; HERBICIDES; TETRACHLOROPHENOLS; TRICHLOROPHENOLS; DICHLOROPHENOLS; CHLOROPHENOLS; REDUCTIVE DECHLORINATION; MICROBIAL ACTIVITY; PADDIES; SOILS; DECOMPOSITION

473
Volatility of Organochlorine Insecticides from Soil. 2. Effect of Relative Humidity and Soil Water Content on Dieldrin Volatility

Igue, K.; Farmer, W.J.; Spencer, W.F.; Martin, J.P.; California University, Riverside, Ca 92502

Soil Sci. Soc. Am. Proc., 36(3), 447-450; 1972

DIELDRIN; CODISTILLATION; VOLATILIZATION; SOIL MOISTURE; HUMIDITY; INSECTICIDES; ORGANOCHLORINES INSECTICIDES; SILT LOAM; SOILS

Volatilization losses from 5 and 10 microgras/g dieldrin in a silt loam soil were determined at initial soil water contents of 10 and 20%, relative humidities of 100, 75, 61 and less than 1% (dry air), air flow rates of 0.005 and 0.0018 mph and temperatures of 20 and 30 degrees C. Dieldrin volatilization was dependent on soil water content but was not dependent on the rate of soil water loss. Relative humidity affected volatilization through its effect on soil water content. Volatilization losses from moist soil were greatest when there was no loss of moisture from soil and were negligible when soil water content was below 2.8%. Temperature, air flow rate and pesticide concentration did not affect the influence of soil water on volatilization.

474
Is Contamination of the Soil with Mercury Reflected by the Plants Grown on it

Imre, R.A.; Berencsi, G.

Zentralbl. Bakteriol. Parasitenkd. Infektionskr. Hyg. Erste Abt. Orig. Reihe B. Hyg. Praev. Med., 155(5-6), 482-487

CEREZAN; LETTUCE; RADISHES; CARROTS; PARSLEY; MERCURY; SOILS; PLANTS

475
Soil Contamination Caused by the Use of Mercury Containing Disinfectants

Imre, R.A.; Berencsi, G.; Luzanyi, L.; Maurer, J.; Szegedi Orvostud. Egy. Koezegeszsegtani Intez., Szeged, Hungary

Zentralbl. Bakteriol. Parasitenkd. Infektionskr. Hyg. Erste Abt. Orig. Reihe B. Hyg. Praev. Med., 155 (5-6), 476-481

HIGOSAN; CEREZAN; PESTICIDES; MERCURY; DISINFECTANT; SOILS; ADSORPTION; SEEDS

Seed grain disinfected with methoxy-ethyl-HgCl-containing preparations (Higosan and Cerezan) was used for sowing for 4 successive years. With repeated sowing, the Hg passed into the soil, provided the soil contained both bound substances and small amounts of organic material. The Hg was mainly adsorbed by the superficial crumbly layers.

476
Mobility of some Organophosphorus Sheep Dip Insecticides in Soil

Inch, T.D.; Ley, R.V.; Utley, D.; Chem. Def. Establ., Porton Down/Salisbury/Wilts., England

Pestic. Sci. (PSSCBG), 3(3), 243-253; 1972

ORGANOPHOSPHORUS INSECTICIDES; SOILS; CHLORFENVINPHOS; RESIDUES; PESTICIDES; CHROMATOGRAPHY; INSECTICIDES; THIN-LAYER CHROMATOGRAPHY; MOBILITY; TRITHION; DELNAV; DICHLOFENTHION; AUTORADIOGRAPHY; SOILS; SHEEP DIP

A soil thin-layer chromatography method for determining the mobility of some organophosphorus sheep dip insecticides such as Chlorfenvinphos, Trithion, Delnav and Dichlofenthion in soil after extraction with heptane is given. The method has been adapted to use either upward or downward irrigation and repeated or prolonged irrigation. Insecticide was used at 150 or 1000 micrograms/plate. The concentration of insecticide in the soil extract was determined by gas chromatography and the position of labeled insecticides was determined by autoradiography.

477
Behavior of Thiocarbamate Herbicides in Soil. 1. Gas Chromatographic Determination of 4-Chlorobenzyl-N, N-Diethylthiolcarbamate (Benthiocarb) in Soil

Ishikawa, K.; Shinohara, R.; Akasaki, K.; Anim. Health Toxicol. Lab., Kumiai Chem. Ind. Co., Ltd., Shizuoka, Japan

Agr. Biol. Che. (ABCHA6), 1971, 35(8), 116-1165; 1971

BENTHIOCARB; SOILS; GAS CHROMATOGRAPHY; CARBAMATE; HERBICIDES; CHROMOSORB W; PHOTOMETRY; CHROMATOGRAPHY

Benthiocarb was removed from soil samples by steam-distillation, and was determined by gas chromatography, using silicon gum se-30 on chromosorb, N as a carrier gas, and a s-specific photometric detector. The column temperature was 190 degrees. The sensitivity was 0.002 micrograms, corresponding to 0.02 ppm benthiocarb residue in soil.

478
Studies on the Behavior of Thio Carbamate Herbicides in Soil. 1. Gas Chromatographic Determination of 4-Chlorobenzyl-N N-Diethyl Thio Carbamate Benthiocarb in Soil

Ishikawa, K.; Shinohara, R.; Akasaki, K.

Agric. Biol. Chem., 35(8), 1971, 1161-1165

THIOCARBAMATE; HERBICIDES; SOILS; GAS CHROMATOGRAPHY; BENTHIOCARB

479
Impact of Pesticide Use on the Japanese Environment

Ishikura, H.

Part of Matsumura, Fumio, G. Mallory Boush and Tomomasa Misato (Ed.). Environmental Toxicology of Pesticides. Proceedings of a United States-Japan Seminar. Oiso, Japan, October, 1971. 637p. Illus. Maps. Academic Press: New York, N.Y., U.S.A.; London, England. 1-32; 1972

HUMANS; INSECTICIDES; FUNGICIDES; FOOD; PESTICIDES

480
Persistence of Herbicides in Irrigated Soils.

Isom, W.H.; California University, Riverside, CA

Part of Proceedings of California Weed Conference, No. 22, (58-63); 1970

PERSISTENCE; HERBICIDES; NITRALIN; TRIFLURALIN; BENFLURALIN; ATRAZINE; PROMETRYNE; SOILS; BARLEY; SUGAR BEETS; SORGHUM; COTTON; SAND; LOAM; CROPS; IRRIGATION

Of nitralin, trifluralin, benfluralin, atrazine and prometryne applied to a loamy sand soil, nitralin was the most persistene (more than 225 days) and prometryne the least (more than 200 days). In a field test of thirteen herbicides applied to a clay soil, sugar beet and barley could be sown safely within 262 days of herbicide application followed by 64 acre-inches of irrigation, and cotton and sorghum within 425 days and 100 acre-inches of irrigation.

481
Static and Kinetic Distribution of Sevin in the Environment

Ivanova, L.N.; Molozhanova, E.G.; Vses. Nauchno-Issled. Inst. Gig. Toksikol. Pestits., Polim. Plast. Mass, Kiev, USSR

Gig. Sanit.(GISAAA) 1973, (2), 24-28; 1973

SEVIN; DISTRIBUTION; INSECTICIDES; APPLE TREES; SOILS; AIR; TREES; PLANTS

482
Persistence of Parathion in Six California Soils Under Laboratory Conditions

Iwata, Y.; Westlake, W.E.; Gunther, F.A.; Citrus Research Center, Dept. of Entomology, University of California, Riverside, Ca 92502

Arch. Environ. Contam. Toxicol.(AEC CV), 1(1), 84-96; 1973

PARATHION; RESIDUES; SOILS; INSECTICIDES; PERSISTENCE; LOAM; SAND; DEGRADATION; HYDROLYSIS; MICROBES; AVAILABILITY; BINDING; FLOODING

Two types of persistence curves were obtained for parathion residues in six california soils under laboratory conditions. In mocho silt loam, linne clay, madera sandy loam, and laveen loamy sand, residues decreased rapidly, from 20 ppm to 0.2-2 ppm in 30 days. Microbial degradation and hydrolysis were responsible for the rapid decline. Degradation by hydrolysis alone appeared to occur in windy loam and santa lucia silt loam in which residues remained above 1.5 ppm for 8 months. Flooding fortified samples of these two soils did not increase the rate of degradation while such treatment noticeably accelerated the decline of parathion residues in madera sandy loam. Parathion disappeared more rapidly in soils with low organic matter, suggesting that binding to organic matter may reduce the availability of parathion for degratation. (17 references)

483
Varying Persistence of Polychlorinated Biphenyls in Six California Soils Under Laboratory Conditions

Iwata, Y.; Westlake, W.E.; Gunther, F.A.; Citrus Res. Cent., Univ. California, Riverside, Calif.

Bull. Environ. Contam. Toxicol.(BECTA6) 1973, 9(4), 204-211; 1973

SOILS; POLYCHLORINATED BIPHENYLS; PERSISTENCE; DDT; AROCLOR 1254; TRANSFORMATION; BIPHENYLS

484
Metabolism of Chlordane and Heptachlor by ASPERGILLUS NIGER

Iyengar, L.; Prabhakara Rao, A.V.S.; Dept. Civ. Eng., Indian Inst. Tech., Kanpur-16, U.P., India

Gen. Appl. Microbiol., 19(4), 321-324; 1973

CHLORDANE; HEPTACHLOR; CHLORINATED HYDROCARBONS; PESTICIDES; MYCELIUM; ALDRIN; CYCLODIENE; DDT; METABOLISM; BHC

A. NIGER metabolism of chlordane and heptachlor, chlorinated hydrocarbons used as pesticides, was studied. The oxidizing activities of mycelium grown in the presence or absence of chlordane and heptachlor on various chlorinated hydrocarbons as substrates were measured. Unadapted organisms could not utilize any of the pesticides. Both chlordane-adapted and heptachlor-adapted A. NIGER utilized chlordane, heptachlor and aldrin, but neither induced organism utilized BHC or DDT. A. NIGER adapted to a cyclodiene pesticide may be able to utilize many other structurally similar compounds.

485
Maneb Fungicide, its Effect on Soils and Tree Growth

Iyer, J.G.; Slayton, S.H.; Wood, W.B.

Adv. Frontiers Plant Sci., 29, 1972, 223-246

MANGANESE; ALUMINUM; IRRIGATION; SOILS; TREES; FUNGICIDES; MANEB

486
Evolution of Carbon-14 Dioxide from Soil Incubated with Dieldrin-14C And the Action of Soil Bacteria on Labelled Dieldrin

Jagnow, G.; Haider, K.; Inst. Bodenbiol., Forschungsanst. Landwirtsch., Brunswick, Germany

Soil Biol. Biochem. (SBIOAH) 1972, 4(1), 43-49; 1972

DIELDRIN; SOILS; BACTERIA; CHLORINATED INSECTICIDES; INSECTICIDES; DIELDRIN; GLUCOSE; CARBON 14; CARBON-14 DIOXIDE; METABOLITES

Arable soil containing 10 ppm of Dieldrin, uniformly 14C-labeled in its chlorinated ring, released 0.30 and 1.86% of the activity as 14CO2 from sterile and nonsterile samples, respectively, during 7 weeks of incubation. In percolated or aerated soil samples containing 50 ppm dieldrin-14C with or without Glucose, 0.30% was lost as 14CO2. about half of 177 bacterial strains isolated from the same soil produced water-soluble dieldrin metabolites in culture. From 14 selected strains the 3 most active strains (NOCARDIA, CORYNEBACTERIUM, and a MICROCOCCUS SPECIES) Released 0.06-0.11% 14CO2 in aerated clutures and 0.14-0.2% in stationary cultures when incubated for 5 weeks with 0.4 ppm dieldrin-14C.

487
Translocation of Mercury from Seed Treatment

James, P.E.; Lagerwerff, J.V.; Dudley, B.P.

Part of Westley, B. (Ed.). Identification and Measurement of Environmental Pollutants. Symposium. Ottawa, Ontario, Canada, June 14-17, 1971. National Research Council: Canada, (p. 213-215) 451 p.; 1971

PEAS; WHEAT; SOILS; ACIDITY; FUNGICIDES; TREATMENT; MERCURY; SEEDS; TRANSLOCATION

488
Microbiological Decomposition of Diuron (N,N-Dimethyl-N'-(3,4-Dichlorophenyl)Urea)

Janko, Z.; Stefaniak, H.; Czerwinska, E.; Inst. Przem. Org., Warsaw, Poland

Pr. Inst. Przem. Org. (Pipobz) 1970, 2, 241-57; 1970

DIURON; DECOMPOSITION; SOILS; BACTERIA; UREA; HERBICIDES

489
Lead Contamination of some Agricultural Soils in Western Canada

John, M.K.

Environ. Sci. Technol., 5 (12), 1971, 1199-1203

LEAD; SOILS; AGRICULTURE; IMMOBILIZATION; URBAN PROXIMITY

HNO2-soluble Pb content of 700 samples of soils from British Columbia was related to proximity to industrial and population centers. The soluble Pb was immobilized in the surface horizons.

490
Cadmium Contamination of Soil and Its Uptake by Cats

John, M.K.; Chuah, H.H.; Vanlaerhoven, C.J.; Research Station, Canada Department of Agriculture, Agassiz, British Columbia, Canada

Environmental Science and Technology, 6(6), 555-557; 1972, June

SOILS; PLANTS; ROOTS; HYPERTENSION; FOOD; FUNGICIDES; TRANSLOCATION; ABSORPTION; DISTRIBUTION; CADMIUM; UPTAKE; OATS; ACCUMULATION; HUMANS; SMELTERS; EMPHYSEMA; CHRONIC BRONCHITIS; BODY; ANIMALS; PLANTS; ZINC; OILS; TIRES; BATTERY SMELTERS

The extent of cadmium contamination of soils in the lower Fraser Valley (SW, British Columbia, Canada) was evaluated. Nitric acid-soluble cadmium in the surface samples among 33 agricultural soils averaged 0.88 ppm. However, nitric acid-soluble cadmium reached as high as 95 ppm in a surface sample taken near a battery smelter, but this level decreased considerably with distance and depth. The effect of soil application of carbonate, nitrate, chloride, sulfate, and phosphate salts of calcium on cadmium uptake by oats was determined in a growth chamber study involving soils taken near a battery smelter and from farmland. Oats grown on the contaminated soils contained very high amounts of cadmium in the roots, with smaller amounts in the above-ground portions. Soil treatments affected the cadmium content of roots significantly but did not affect the cadmium content of tops.

491
Influence of Soil Amendments on the Metabolism of DDT in Soil

Johnsen, R.E.; Lin, C.S.; Collyard, K.J.; Dep. Entomol., Colorado State Univ., Fort Collins, Co

Pestic. Chem., 2nd Proc. Int. Congr. Pestic. Chem., (24WAAY) 1972, 6, 139-56; 1972

DDT; DEGRADATION; SOILS; MANURE; METABOLISM; TDE

DDT was readily degraded to TDE in soil, which had been amended with cattle manure. Tde degraded slowly in amended soil. Ddt metabolized very slowly in unamended soil, and there was no apparent degradation of DDT or TDE in soil which was incubated with manure.

492
The Degradation of DDT by Soil-Borne Bacteria

Johnson, B.T.

Sci. Eng., 29(9), 3156-3158; 1969

DEGRADATION; DDT; SOILS; BACTERIA

493
Arsenic Content of Soil and Crops Following Use of Methanearsonate Herbicides

Johnson, L.R.; Hiltbold, A.E.

Proc. Soil Sci. Soc. Am., 33, 279-282; 1969

CROPS; COTTON; SOYBEANS; SORGHUM; OATS; MAIZE; VETCH; CLOVER; RATE; ARSENIC; SOILS; HERBICIDES

Much of the applied As remained in the upper 30cm of soil. The As content of crops (cotton, soybean, sorghum, oats, maize, vetch, clover) grown on treated soil was related to the rate and form of As applied, but yields were not reduced by residual As in soil.

494
Metabolism of 3-Chlorobenzoic-Acid by a Pseudomonad

Johnston, H.W.; Briggs, G.G.; Alexander, M.

Soil Biol. Biochem., 4 (2), 1972, 187-190

CARBON; CHROMATOGRAPHY; INFRARED SPECTROPHOTOMETRY; HERBICIDES; DEGRADATION; METABOLISM; 3-CHLOROBENZOIC-ACID

495
Nonbiological Detoxication of the S-Triazine Herbicides

Jordan, L.S.; Farmer, W.J.; Goodin, J.R.; Day, B.E.

Residue Reviews, 32, 267; 1970

DETOXIFICATION; S-TRIAZINE; HERBICIDES

496
Adsorption and Deactivation of Atrazine and Diuron by Charcoals

Jordan, P.D.; Smith, L.W.; Dep. Bot., Univ. Guelph, Guelph, Ontario, Canada

Weed Sci.(WEESA6) 1971, 19(5) 541-4; 1971

HERBICIDES; DEACTIVATION; SOILS; CHARCOAL; ADSORPTION; ATRAZINE; DIURON: INACTIVATION; OATS

A direct relation existed between the adsorption of Atrazine and Diruon by charcoal and the inactivation of these two herbicides by charcoal in the soil. The inactivation was tested for 9 brands of charcoal, by determining the phytotoxicity of the soil samples to oats. Several charcoals deactivated residues of 0.3 ppm atrazine and 1 ppm diuron, when they were present at concentrations of 30-50 ppm in the soil.

497
Miscible Displacement of 2,4-D Herbicide During Constant Liquid Flow Velocity into Initially Dry Soils

Jyothi, V.; Univ. Florida, Gainesville, Fla.

(DABSAQ) 1971, 120; 1971

DICHLOROPHENOXYACETATE; HERBICIDES; DIFFUSION

498
Preliminary Study on the Effect of Benomyl on the Fungal Flora in a Greenhouse Soil

Kaestra-Howeler, L.H.; Gams, W.

Neth. J. Plant Pathol., 79(4), 156-158; 1973

BENOMYL; FUNGAL FLORA; GREENHOUSE; FLORA; SOILS

499
Heavy Metals in Various Preparations and Fertilizers used in Agriculture

Kabata-Pendias, A.; Piotrowska, M.

Postepy Nauk Roln., 19(2), 13-29; 1972

PESTICIDES; METALS; FERTILIZERS; AGRICULTURE

500
The Persistence of Malathion When Used as Grain Protectant

Kamel, A.H.; Fam, E.Z.

Agric Res Rev (Cairo) 48 (1). 1970 48-58.

WHEAT; INSECTICIDES; PERSISTENCE; MALATHION; GRAINS

501
Pollution of the Ecosystem by Insecticides. 2. Environmental Pollution by Organochlorine Insecticides

Kanazawa, J.; Yushima, T.; Kiritani, K.; Natl. Inst. Agric. Sci., Tokyo, Japan

Kagaku (Kyoto)(Kakyau) 1971, 41(7), 384-91; 1971

INSECTICIDES; REVIEW; SOILS; WATER

A review with 40 references soil and water pollution by insecticides, especially BHC residues, and the fate of residues in soil are discussed.

502

Effect of Fungicide Dexon (p-Dimethylamino-benzenediazo Sodium Sulfonate) on Soil Aggregation

Karanth, N.G.; Vasantharajan, V.N.; Microbiology and Pharmacology Laboratory, Indian Institute of Science, Bangalore, India

Current Science, 40(15), 394-396; 1971

SOILS; DEXON; FUNGICIDES; AGGREGATION; SULFONATE; LOAM

Samples of red loam soil containing 0.1% N as NH4Cl or NaNO2 were incubated with 0, 1000 and 2000 ppm Dexon for up to 8 weeks at 25-30 degree C. Dexon recovery was 70-80% immediately after application and 7-20% 8 weeks after application. Na4Cl, NaNO2 and Dexon caused decreases in the percentage of water-stable aggregates after incubation for 5 weeks but the decrease caused by Dexon had almost disappeared after 8 weeks incubation. In a second experiment NH4Cl, NaNO2 and Dexon were added to soil samples and aggregation was determined immediately. All Dexon-treated soils showed an increase in aggregation immediately after treatment and this increase was greatest when Dexon was added to soil after NH4Cl or NaNO2.

503

Persistence and Effect of Dexon on Respiration of Soil Microflora

Karanth, N.G.; Vasantharajan, V.N.; Microbiol. Pharmacol. Lab., Indian Inst. Sci., Bangalore, India

Soil Biol. Biochem.(SBICAH) 1973, 5(5), 679-84; 1973

DEXON; SOILS; MICROFLORA; METABOLISM; FUNGICIDES; RESPIRATION

504

Effects of Sodium Chlorate on Soil Microorganisms, their Respiration and their Enzymic Activity

Karki, A.B.; Coupin, L.; Kaiser, P.; Moussin, M.; Ser. Microbial. Sol, Inst. Pasteur, Jouy-en-Josas, France

Weed Res.(WEREAT) 1973, 13(2), 133-9; 1973

SODIUM CHLORATE; SOILS; BACTERIA; HERBICIDES; MICROFLORA; RESPIRATION; ENZYME; ACTINOMYCETES; CELLULOLYSIS; AMMONIFICATION; NITRIFICATION; CARBON DIOXIDE; METABOLISM; DEHYDROGENASE

Herbicidal treatment with granular sodium chlorate (150 kg/ha) had no effect on the total number of soil microflora, as well as on the number of actinomycetes, and of cellulolytic, ammonifying, nitrifying and denitrifying bacteria. In samples taken after 27 days, the evolution of CO2 was initially the same in treated and untreated soils, but later diminished in the treated soils, indicating a decrease in total microbial metabolism there were no differences in samples taken after 150 days. The dehydrogenase activity was decreased at 5 and 27 days after NaClO3 treatment.

505

Microbial Conversions of Dithiocarbamate Fungicides

Kaars Sijpesteijn, A.; Vonk, J.W.; Org. Chem. Inst., TNO, Utrecht, Netherlands

Meded. Rijksfac. LandbWet. Gent, 35, 799-804; 1970

FATE; DIALKYLDITHIOCARBAMATES; BISDITHIOCARBAMATE; SOILS; FUNGICIDES; MICROBIAL CONVERSION

The fate of dialkydithiocarbamate and bisdithiocarbamate in soil is discussed.

506

Degradation of Pesticide Combinations

Kaufman, D.D.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd24WAA), 6, 175-204; 1972

REVIEW; PESTICIDES; COMBINATION; DEGRADATION; HERBICIDES; HYDROLYSIS; ENZYME; ACCUMULATION; INSECTICIDES; NEMATOCIDES; FUNGICIDES; PERSISTENCE; RESIDUES; METHYLCARBAMATE; ORGANOPHOSPHATE INSECTICIDES; PHENYLCARBAMATES; ACYLANILIDES; ACETAMIDE

Increased or decreased persistence and the formation of complex residues sometimes result from the use of various pesticides in simultaneous or successive applications. Whether or not these effects are desirable depends upon the ultimate result of the interaction involved. The formation of persistent residue complexes is undesirable, and decreased persistence of pesticide residues is needed. Certain methylcarbamate and organophosphate insecticides inhibit the enzymatic hydrolysis of several phenylcarbamates, acylanildes, and acetamide type herbicides by soil microorganism, thus increasing their persistence in soil. Controlled persistence of readily degradable pesticides may facilitate better and longer pest control with reduced applications and application rates, and ultimately reduce accumulation of undesirable residues. Careful selection of pesticide combinations or formulations can aid in the control of residual toxicity. In deliberate use of pesticide combinations factors such as reliability and effectiveness, as well as the economics of their production, their toxicology, and the ecological acceptability of their individual and their combined residues, must also be considered.

507

Microbial Degradation of Several Acetamide Acylanilide Carbamate Toluidine and Urea Pesticides

Kaufman, D.D.; Blake, J.

Soil Biol Biochem., 5(3), 297-308.; 1973

GAS LIQUID CHROMATOGRAPHY; THIN LAYER CHROMATOGRAPHY; DEGRADATION; CARBAMATES; PESTICIDES; TOLUIDINES; DEGRADATION

508
Degradation of Atrazine by Soil Fungi

Kaufman, D.D.; Blake, J.; U.S. Dept. of Agriculture, Beltsville, Md

Soil Biol. Biochem., 2(2), 73-80; 1970

HERBICIDES; CHROMATOGRAPHY; DEGRADATION; ATRAZINE; FUNGI

A review dealing with the evidence for degradation of s-triazines in microbial systems, the mechanisms of degradation and biodegradation of chloro-s-triazine, methoxy-s-triazine, and methylthio-s-triazine. (103 references)

509
Methyl Carbamates Affect Acylanilide Herbicide Residues in Soil

Kaufman, D.D.; Blake, J.; Miller, D.E.

J. Agr. Food Chem., 19(1), 204-206; 1971

PARA CHLOROPHENYLMETHYLCARBAMATE; ACYLANILIDES; RESIDUES

510
Methylcarbamate Inhibition of Phenylcarbamate Metabolism in Soil

Kaufman, D.D.; Kearney, P.C.; Vonendt, D.W.; Miller, D.E.

J. Agr. Food Chem., 18(3), 513-9; 1970

BIOASSAY; PERSISTENCE; METHYLCARBAMATE; DEGRADATION; CIPC

Bioassays of treated soil indicated that the insecticidal n-methylcarbamates: 1-naphthyl, o-isopropoxyphenyl, 4-dimethylamino-m-toyl 6-chloro-3, 4-xylyl and 4-dimethylamino-c,5-xylyl n-methylcarbamate increased the herbicidal persistence of isopropyl m-chlorocarbanilate (CIPC). Soil pH, soil type, time of treatemnt and methylcarbamate concentration did not significantly affect this interaction in soil systems. The microbial degradation of CIPC was inhibited by 1-naphthyl in soil perfusion studies. An explanation for these phenomena was found in enzymatic studies, conducted with a purified enzyme isolated from CIPC-degrading soil microorganisms. Enzymatic hydrolysis of CIPC was inhibited by 1-naphthyl, O-isopropoxyyphenyl, 4-dimethylamino, 6-chloro-3,4-xylyl, and 4-dimethylamino-C,5-xyly N-methylcarbamate but not by isoprophyl m-chlorocarbanilate. Kinetic studies revealed that methylcarbamates are competitive inhibitors of the phenylcarbamate-hydrolyzing enzyme. Failure of isoprophyl m-chlorocarbanilate to cause inhibition was attributed to steric hindrance by the two ortho-substituted tertiary-butyl groups. (25 references)

511
Studies on Organochlorine Pesticide Residues in Crops and Soils. 15. Absorption of BHC by Stems and Leaves of Rice Plants.

Kawahara, T.; Agr. Chem. Insp. Sta., Min. of Agr. and Forestry, Tokyo, Japan

Bull. Agr. Chem. Insp. Sta., 12, 31-34; 1972

BHC; ADSORPTION; RESIDUES; RICE; PLANTS; PESTICIDES; SOILS; ISOMERS; PADDIES; STEMS; LEAVES; ORGANOCHLORINES PESTICIDES; HEXACHLOROBENZENE; LINDANE

Absorption and residues of alpha-, beta-, gamma-, and delta-BHC mixed uniformly with volcanic ash soil at levels of 0.05, 0.1, 0.05 and 2 ppm were studied in rice plants. Residues of each isomer were determined in the straw, root, and soil after harvesting. The amount of absorbed BHC was, on the whole, larger in the root than in the straw, the concentration of each isomer decreasing in the order alpha greater than beta greater than delta greater than gamma in the root and beta greater than or equal to delta greater than gamma in the straw. Increased concentration of an isomer in the soil caused increased concentration of residues in the whole plant except those of gamma- and beta-isomers in the straw. Other isomers in both parts of the plant plateaued. The residual amount of BHC at harvest was proportional to the added amount of BHC although gamma-BHC disappeared faster than the other isomers when its concentration in the soil was high. The results of the present experiment supported the results of investigation in paddies.

512
Studies on the Residual Organochlorine Pesticides in Crops and Soils. 14. Disappearance of BHC on Petri-dish in Laboratory Room

Kawahara, T.; Agr. Chem. Insp. Sta., Min. of Agr. and Forestry, Tokyo, Japan

Bull. Agr. Chem. Insp. Sta., 12, 46-48; 1972

HEXACHLOROBENZENE; BHC; PERSISTENCE; LINDANE; DECOMPOSITION; EVAPORATION; PESTICIDES; ORGANOCHLORINE PESTICIDES; RESIDUES; SOILS; ISOMERS; CROPS

Disappearance of alpha-, beta-, gamma-, and delta-BHC was traced on a Petri dish in amounts similar to those in fields. Normal temperatures under diffused sunlight were used for about two months. Regardless of formulations (wettable powder, dust, EC) the disappearance of gamma-isomer was the fastest, the residue almost disappearing within 5 days; days required for 90% disappearance were 1.8 in EC, 3.3 in dust, and 4.5 in wettable powder. Those for alpha-isomer were 2 in EC, 4 in wettable powder, and about 23 in dust; complete disappearance occurred in 10, 20, and 28 days, respectively. The delta-isomer took 5.8, 17, and 19 days for 90% disappearance; dust and EC took 28 and 58 days for complete disappearance. Beta-isomer persisted longer than other isomers, taking 4.5, 29, and 32 days for 50% disappearance. The curves of residual amount versus time were similar to those for BHC applied on crops or in water, suggesting that evaporation and decomposition by sunlight are the main factors for disappearance.

513
Absorption of BHC by Rice

Kawahara, T.

Noyaku Kensasho Hokoku(NKHOAK), 12, 31-4; 1972

BHC; ABSORPTION; RICE; SOILS

514
Organochlorine Pesticide Residues in Plants and Soils. 12. Absorption of Aldrin and Dieldrin in Turnips

Kawahara, T.; Agric. Chem. Insp. Stn., Minist. Agric. For., Kodaira, Japan

Noyaku Kensasho Hokoku (NKHOAK), 11, 81-6; 1971

ORGANOCHLORINEPESTICIDES;ABSORPTION;TURNIPS;DIELDRIN;ALDRIN; PLANTS; PESTICIDES SOILS

515
Studies on the Residual Organochlorine Pesticides in Crops and Soils

Kawahara, T.; Agr. Chem. Insp. Sta., Min. of Agr. and Forestry. Tokyo, Japan

Bulletin Agriculture Chemical Inspection Station, 12, 49-51; 1972

BHC; PESTICIDES; HEXACHLOROBENZENE; PERSISTENCE; ORGANOCHLORINE PESTICIDES; LINDANE; HALF-LIFE; WATER; SOILS

The disappearance over time of alpha, beta, gamma, and delta-BHC respectively, dissolved in tap water at concentrations of 0.01, 0.1, 1.0, and 5.0 ppm was studied. The samples were kept in an open wide-mouthed transparent glass bottle under natural sunlight. Tap-water was added every two days for 48 days. Alpha and beta-BHC disappeared most quickly; alpha-BHC residues dropped to about 10% after 7 days and a minute amount persisted for 48 days; beta-BHC residue dropped to 20-30% (less in more dilute solution) after 10 days. Gamma-BHC (lindane) followed a pattern similar to alpha-BHC except at a concentration of 5 ppm; after 48 days residues were only traces. No definite trend occurred with the disappearance of delta-BHC concerning concentration; at all concentrations it took the longest time to disappear. The half-lives under the above conditions were 4-6, 4.5-9, 5-11, and 10-20 days for alpha-, beta, gamma, and delta-BHC.

516
Variation of Pesticide Residues in Fields. 1. Lead Arsenate in Apple Orchard and Fenitrobthion in Vineyard

Kawahara, T.; Goto, S.; Fujimoto, Y.; Watanabe, T.; Maeda, H.; Agric. Chem. Insp. Stn., Kodaira, Japan

Noyaku Seisan Gijutsu (NSGIAJ), 27, 17-20; 1972

LEAD; ARSENATE; RESIDUES; APPLES; GRAPES; LEAD ARSENATE; FENITROTHION

Residues of as on lead arsenate(PBHASO4)-treated apple trees were higher on apples from lower branches, than on those from higher branches. No such difference was shown in the Pb residues. The disappearance of As was more rapid than that of Pb. Considerable differences were found in Fenitrothion residue levels in grapes.

517
BHC in Soil and River Water in a Forest

Kawahara, T.; Matsu-Ura, K.; Nakamura, H.; Kodaira-shi, Tokyo, Japan

Bulletin of the Agricultural Chemicals Inspection Station, 11, 76-80; 1971

BHC; SOILS; RIVERS; FORESTS; WATER; RESIDUES LOAMS; HUMUS; SOIL MOISTURE; LINDANE; HEXACHLOROBENZENE; SANDY LOAM

The amount of BHC residues in the soil varied with sampling site and pesticide treatment. In general it was greater in loam than in sandy loam and greater in soil of high humus content. There was no relationship between the amount of residue and soil moisture content. The highest levels of alpha-BHC, beta-BHC, gamma-BHC and delta-BHC were 1.16, 0.675, 0.54 and 0.24 ppm respectively.

518
Studies on the Residual Organochlorine Residues in Crops and Soils. 18. BHC in Soils of Paddy Field

Kawahara, T.; Matsui, M.; Nakamura, H.; Chem. Insp. Sta., Min. of Agr. and Forestry, Tokyo, Japan

Bull. Agr. Chem. Insp. Sta., 12, 42-45; 1972

BHC; HEXACHLOROBENZENE; ORGANOCHLORINE RESIDUESS; SOILS; PADDIES; RICE; CROPS; PERSISTENCE; CLAY; SAND; RESIDUE; PESTICIDES; LINDANE

Contamination of the surface soil layer (0-20 cm) and the subsoil (deeper than 20 cm) by BHC was studied in paddy fields in three prefectures. On the whole, BHC persisted more in the surface soil layer (0.097, 0.430, 0.042, and 0.006 ppm of alpha, beta, gamma, and delta-isomer) than in subsoil (0.006, 0.032, 0.007, and 0.001 ppm). The amount of each isomer persisting in soils was in the order of beta greater than alpha greater than gamma greater than delta, both in the surface layer and in the subsoil, in spite of the larger quantity of alpha-isomer in technical BHC. Smaller applications resulted in less contamination by the residue. Beta-BHC persisted in soil longer than delta-BHC, and BHC was more persistent in clay soil than in sandy soils.

519

Studies on Organochlorine Pesticide Residues in Crops and Soils. 16. Degradation and Isomerization of BHC Isomers by Heating

Kawahara, T.; Moku, M.; Agr. Chem. Insp. Sta., Min. of Agr. and Forestry, Tokyo, Japan

Bull. Agr. Chem. Insp. Sta., 12, 35-37; 1972

ORGANOCHLORINE PESTICIDES; CROPS; SOILS; DEGRADATION; BHC; HEXACHLOROBENZENE; CIGARETTES; SMOKING; ISOMERIZATION; TRICHLOROBENZENE; LINDANE

As a followup to reports of BHC residues in commercial cigarettes and interconversions of isomers during smoking, a study was performed on the behavior of BHC isomers in cigarettes during heating. Studies were also carried out on individual purified isomers. When 5 g of a brand of cigarettes containing 0.745, 1.155, 0.865, and 0.815 micrograms respectively of alpha-, beta-, gamma-, and delta-BHC was ashed in an evaporating dish on an electric heater, the smoke evolved contained 0, 0.340, 0.505, and 0.307 micrograms of the respective isomers. The change in isomer ratio suggests decomposition and isomerization during heating. When 1 micron of each BHC isomer was heated individually, the alpha-isomer yielded 159, 148, and 41 ng of the beta-, gamma-, and delta-isomers, respectively, with 158 ng of unchanged alpha-isomer; the beta-isomer gave 116, 152, and 43 ng of the alpha-, gamma-, and delta-isomers with 317 ng of unchanged beta-isomer; the gamma-isomers with 178 ng of unchanged gamma-isomer; and the delta-isomer gave 112, 113, and 147 ng of the alpha-, beta-, and gamma-isomers with 110 ng of unchanged delta-isomer. As decomposition products, 1,2,3- and 1,2,4-trichlorbenzene were detected. Isomerization also occurred when isomers were heated in a silica tube to exclude the possible catalytic action of trace metals in the evaporating dishes.

520

Organochlorine Pesticide Residues in Plants and Soils. 7. Organochlorine Pesticides in Commercial Cigarettes

Kawahara, T.; Moku, M.; Nakamura, H.

Noyaku Kensasho Hokoku, 11, 59-60; 1970

ORGANOCHLORINE PESTICIDES; DDT; ALDRIN; DIELDRIN; ENDRIN; CIGARETTES

The levels of organochloride pesticide detected in 5 commercial cigarettes were. 0.106-0.716 ppm-BHC; 2.820-5.339 ppm DDT; 0.000-0.094 ppm aldrin; 0.113-0.236 ppm dieldrin; 0.353-1.643 ppm endrin. The endrin level was lower and aldrin level was higher in Japanese cigarettes than in American or West German products.

521

Organochlorine Pesticide Residues in Plants and Soils. 8. Absorption and Translocation of Organochlorine Pesticides in Tobacco

Kawahara, T.; Nakamura, H.

Noyaku Kensasho Hokoku, 11, 61-66; 1971

CHLORINATED HYDROCARBONS; BHC; ALDRIN; DIELDRIN; DDT; TOBACCO; PLANTS; ROOTS; LEAVES; ABSORPTION

All chlorinated hydrocarbons including BHC, aldrin, dieldrin and DDT tested were absorbed into tobacco plants. The levels of BHC and DDT absorbed were greater than those of aldrin and dieldrin, and the levels of the chlorinated hydrocarbons absorbed were high in roots and low in leaves. Almost the same concentration aldrin (0.07 ppm) was detected in every part of tobacco 18 days after the treatment. The absorption of alpha-BHC and gamma-BHC was greater than that of beta-BHC and delta-BHC.

522

Pesticide Interactions

Kawai, M.; Iwahara, S.; Sasaki, Y.; Mikami, T.; Watanabe, I.; Ochiai, Y.; Medical School, Ground Self Defense Force, Tokyo, Japan

Boei Eisei (Nat. Def. Med. J.), 20(12), 509-512; 1973

PESTICIDES; MAMMALS; FUNGICIDES; MICE; MORTALITY; LD25; PARATHION; FENITROTHION; DICHLORVOS; DDT; PCP; LINDANE; HINOSAN; PROPINEB; EPN

To obtain information concerning synergism between pesticides in acute toxicity to mammals, five organophosphates, three organochlorines, and four fungicides were tested. Pairs of these pesticides were injected subcutaneously into male dd mice, each at a LD25 dose, and mortality was observed for one week (A). The expected mortality rate (B) was calculated as the sum of the mortality rates obtained when one LD25 of each pesticide was injected individually. Effects were designated as synergistic, additive, or antagonistic, respectively, for A/B ratios of more than 1.5, 0.6-1.5, and less than 0.6. The pairs of pesticides which showed synergism were parathion + fenitrothion (A/B = 2.1), dichlorvos + DDT (1.5), PCP + fenitrothion (1.5), PCP + DDT (1.6), PCP + lindane (1.6), Hinosan + fenitrothion (1.6), Hinosan + malathion (1.6), tetrachloroisophthalonitrile + malathion (1.9), tetrachloroisophthalonitrile + dichlorvos (1.7), and propineb + malathion (1.6). Those which showed antagonism were parathion + malathion (0.3), EPN + DDT (0.4), DDT + lindane (0.3), and Hinosan + dichlorvos (0.2). All other pairs, including Blasticidin-S in all combinations, showed additive effects. The mechanisms of synergism and antagonism between pairs of pesticides were discussed.

523

Decomposition of Sinalbin. 2. The Decomposition Products of Sinalbin and Their Degradation Pathways

Kawakishi, S.; Namiki, M.; Watanabe, H.; Muramatsu, K.

Agr. Biol. Chem., 31(7), 823-830; 1967

DECOMPOSITION; SINALBIN; DEGRADATION; PATHWAYS

524

Fate of Organophosphorus Insecticides in Soils. 1. The Retention of 32-P-Labeled Disulfoton and Dimethoate in the Three Soils. 2. The Changes of the Retention and the Metabolism of 32-P-Labeled Disulfoton and Dimethoate in the Soils

Kawamori, I.; Sait, T.; Iyatomi, K.

Bochu Kagaku, 36(1), 7-17; 1971

SILTY CLAY LOAM; LOAMY SAND; DISULFOTON; DIMETHOATE; METABOLISM, RETENTION; RESIDUES; INSECTICIDES; CLAY; DECOMPOSITION; DEGRADATION; CLAY LOAM; LOAM; SAND

The relationships between the amounts of 32-P-labeled disulfoton and dimethoate applied to soil and the levels retained increased linearly with increased levels of application. Disulfoton was retained by soil to a higher degree than dimethoate. Retention by the different soils varied in the order: silty clay loam greater than clay loam greater than loamy sand. The insecticide residues were found mostly in the extractable organic matter fractions and the residue levels attained depended on the organic matter content rather than on the clay content of the soils. Retention of the insecticides also varied inversely with their water solubility. The nature of the interactions with soil components is briefly discussed. The cation exchange capacity of the soils seemed to influence retention. When aqueous suspensions of the soils were incubated with the insecticides for 0, 2, 6 and 10 days, then drained, more disulfoton was retained initially and only slight increases in the residue levels occurred later. Dimethoate residues increased rapidly during the first 2 days. Gradual decomposition of the parent compounds was detected during the experiment. The differences in the radioactivity extractable from the organic matter and in the chloroform-extractable materials in the aqueous eluates of the soils are discussed. The sulfoxide of disulfoton was detected after 10 days, but the major degradation products were the sulfoxide and sulfone of the thiol derivative. No breakdown products of dimethoate were identified. (23 references)

525

Fate of Organo Phosphorus Insecticides in Soils

Kawamori, I.; Saito, T.; Iyatomi, K.

Botyu-Kagaku, 36(1), 71, 7-12

DISULFOTON; DIMETHOATE; FATE; ORGANOPHOSPHORUS; INSECTICIDES; SOILS

526

Metabolism of Methylcarbamate Insecticides in Soils

Kazano, H.; Kearney, P.C.; Kaufman, D.D.

J. Agr. Food Chem., 20(5), 975-979; 1972

PERSISTENCE; METABOLISM; METHYLCARBAMATE; CARBARYL; HYDROLYSIS; DEGRADATION; METABOLITES; NAPHTHOL; SOILS

The persistence and metabolism of carbon 14-Carbonyl-labeled carbaryl (1-naphthyl methylcarbamate) and 3,5-Xylyl methylcarbamate were studied in five different soil types at two concentrations. Persistence was influenced by soil type, and $^{14}CO_2$ evolution varied from 2.2 to 37.4% of initial radioactivity during 32 days of incubation. Hydrolysis was the main pathway of degradation since very low concentrations of ^{14}C-carbonyl metabolites were detected. $^{14}CO_2$ evolution from ^{14}C-1,4,5,8-Ring-Labeled naphthol in soil was only 8.2% after 60 days. More than 70% of radioactivity was found to be linked to humic substances. Four metabolites, one of which was coumarin, were produced from ring-labeled naphthol by a soil pseudomonad. (16 references)

527

The Poison Chain for Mercury in the Environment

Kazantzis, G.; Dept. Med., Middlesex Hosp. Med. School, London, W.1., England

Int. J. Environ. Stud., 1, 301-306; 1971

ORGANOMERCURIALS; MERCURY; FUNGICIDES; INDUSTRIAL EFFLUENTS; LEACHING; SOILS; WOOD PULP PROCESSING PLANTS; RICE; SEED DRESSINGS; BIRDS; FOOD CHAINS; METHYLATION

Organic mercurials, which are more toxic than inorganic salts of mercury, enter the environment as fungicides and are converted to inorganic mercury by living systems. When used as fungicides, these compounds can be leached out of soil, eventually reaching waterways, or escape from wood pulp processing plants. In Japan, agricultural uses have been limited since an average concentration of 0.1 ppm mercury was found in rice. In 1966, Sweden banned the use of mercury seed dressings because of the large numbers of birds dying of mercury poisoning. Since that time mercury levels have decreased in birds at the end of the aquatic food chain. Mercury concentration in some Swedish waters may prohibit production of edible fish for 50 or 60 years. Mutagenic and teratogenic effects of mercury have been observed at concentrations below those causing intoxication. (18 references)

528

Residue Studies on Aldicarb in Soil and Scotch Pine

Kearty, W.H.; Ercegovich, C.D.; Bliss, M.; Penn. State Univ., University Park, PA

J. Econ. Ent., 63, 1317-1318; 1970

ALDICARB; RESIDUES; SOILS; SCOTCH PINE; TREES; ICAM

Aldicarb granules were applied at 0.5, 1.0, and 2.0 lb per 12 trees on a fine loam typic hapludult soil. When applied at 0.5 and 1.0 lb rates, no residue was found in the soil at 36 and 63 days respectively, and only 0.07 ppm was detected at 63 days at the highest application rate. Soil samples were taken at 6-12 inches.

529
Microbial Degradation of some Chlorinated Pesticides

Kearney, P.C.; Kaufman, D.D.; Plant Sci. Res. Div., Agric. Res. Serv., Beltsville, Md.

Degradation Syn. Org. Mcol. Biosphere, Proc. Conf. (26PWAT), 166-89, 1971; 1972

REVIEW; PESTICIDES; METABOLITES; BACTERIA; SOILS; CHLORINATED PESTICIDES

A review on microbial reactions associated with several major classes of pesticides. The environmental implications of certain pesticide metabolites or by-products are discussed. (91 references)

530
Microbial Degradation of Herbicides

Kearney, P.C.; Agricultural Research Service

Presented at American Society of Agronomy, 63rd Annual Meeting, New York, NY, August 15-20, 1971 (p. 41), 164 p.; 1971

HERBICIDES; MICROBIAL DEGRADATION; SOILS; PERSISTENCE; CHEMICAL BONDS; ENZYMATIC CLEAVAGE

Soil microorganisms are responsible for degrading a large number of organic herbicides and reducing their persistence in the environment. Microbial metabolism causes fragmentation of the herbicide molecule at certain specific sites. These sites represent chemical bonds between different atoms subject to enzymatic cleavage and include C-Cl, C-N, C-As, C-O, C-S, and C-C. Herbicide persistence and the structure of the resulting metabolite is a function of the rate of cleavage of these bonds in the molecule. This rate is determined by many variables, including molecular structure, the microorganisms, and the soil environment.

531
Tetrachlorodibenzodioxin in the Environment: Sources, Fate, and Decontamination

Kearney, P.C.; Agricultural Research Service, Beltsville, Maryland

Env. Health Perspectives, 5, 273-277; 1973, September

TETRACHLORODIBENZODIOXIN; DIOXINS; FATE; DECONTAMINATION; TCDD; 2,4,5-T; CHLORINATED HYDROCARBONS; INSECTICIDES; PERSISTENCE; SOILS; DECOMPOSITION; REVIEW; MOBILITY

The major source of tetrachlorodibenzodioxin (TCDD) input into the environment in the past has been from use of the herbicide, 2,4,5-T. Future inputs will be minimal if the dioxin content is held at low levels during the manufacturing process. In the environment, TCDD behavior is similar to shorter-lived chlorinated hydrocarbon insecticides; it is fairly persistent and immobile in soils, not taken up into the economic portion of plants, and slowly decomposed in water in sunlight. Research results and survey data collected by Agricultural Research Service regarding the sources, fate in the environment, and decontamination of TCDD are summarized.

532
Persistence of Herbicides in Soils

Kearney, P.C.

Isr. J. Entomol. 6(2), 1971, 169

MICROBIOLOGY; METABOLISM; PLANTS; BIOASSAY; CARBAMATES; ALIPHATIC ACIDS; DIURON; SIMAZINE; PHENYL; UREA; FENAC; DALAPON; PERSISTENCE; HERBICIDES; SOILS

533
Reactions of Pesticides in Soils

Kearney, P.C.; Helling, C.S.

Residue Ref., 25, 25-44; 1969

DECOMPOSITION; SOILS; HERBICIDES; MODEL; HYDROLYSIS; MALATHION; DIAZINON; MALATHION MONOACID; DEALKYLATION; PESTICIDES; DEHALOGENATION; DEALKYLATION; AMIDES; ESTER HYDROLYSIS; OXIDATION; REDUCTION; ETHER FISSION

A summary of pertinent reactions associated with pesticide decomposition in soils is presented. While primary emphasis is placed on reactions of herbicides, other pesticide decompositions are included. Studies with sterile soils and model systems have revealed that purely chemical systems play a role in destroying herbicides. Chemical reactions are usually characterized by hydrolysis. Examples are the hydrolyses of cis- and trans-1,3 dichloropropene to the corresponding 3-chloroallyl alcohols, diazinon to 2-isopropyl-4 methyl-6-hydroxypyrimidine and d,d-diethylthiophosphoric acid, malathion to malathion monoacid and the 2-chloro-s-triazines to their respective 2-hydroxy analogs. In some instances, dealkylation of the pesticides may also occur. The principal microbial reactions associated with pesticide decomposition by soil microorganisms include dehalogenation, dealkylation, amide or ester hydrolysis, oxidation, reduction, ether fission, aromatic ring hydroxylation and ring cleavage. Since the first five reactions are of major importance in soil metabolism, they are discussed in detail and specific examples are given. Although these reactions have been demonstrated to occur in soils, information relating to the reaction mechanisms has largely come from other systems. Therefore, where pertinent, reference is made to more specific enzymes and organeeles where mechanistic evidence exists. (60 references)

534
Environment Significance of Chlorodioxins

Kearney, P.C.; Isensee, A.R.; Helling, C.S.; Woolson, E.A.; Plimmer, J.R.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md

Advan. Chem. Ser.(ADCSAJ) 1973, 120, 1005-11; 1973

CHLORODIOXIN; PLANTS; SOILS; HERBICIDES; TRICHLOROPHENOXACETATE; TERATOGEN; PERSISTENCE; MOBILITY; UPTAKE; OATS; SOYBEANS; PHOTODECOMPOSITION; DEGRADATION; METABOLITES; DIOXINS; 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN

2,3,7,8-tetrachlorodibenzo-p-dioxin, an impurity in 2,4,5-T, was immobile and persistent in soils and not readily taken up by plants (oats and soybeans). 2,3,7,8-tetrachlorodibenzo-p-dioxin was subject to photodecomposition and was slowly degraded in the soil to polar metabolites. Some dioxins have been reported to have teratogenic effects; however, 2,3,7,8-tetrachlorodibenzo-p-dioxin environmental contamination appears to be very slight at the present time.

535
Persistence of Pesticide Residues in Soils

Kearney, P.C.; Nash, R.G.; Isensee, A.R.

Part of Miller, M.W.; Berg, G.G. (Eds.), Chemical Fallout-Current Research on Persistent Pesticides, Proceedings Publication of Rochester University Conferences, Rochester, NY (p. 54-67) 531

PERSISTENCE; SOILS; PHOSPHATES; INSECTICIDES; CHLORINATED HYDROCARBONS; DISAPPEARANCE; HEAVY METALS; ARSENIC; RESIDUES; PESTICIDES

Pesticide persistence in our environment is of current national interest. The effective life of pesticides in soils varies from a few weeks to several years. Their persistence depends primarily on the structure and properties of the compound, and to a lesser degree on location and soil properties. Extremes in persistence are found with the insecticides. The highly toxic phosphates do not persist for extended periods of time in soils. In contrast, some of the chlorinated hydrocarbon insecticides may persist for four to five years under normal rates of application. Disappearance of most complex organic pesticides from soil follows a first-order reactor curve. Disappearance of simpler organic pesticides often exhibits a lag phase followed by rapid metabolism by soil microorganisms. Heavy metals and arsenic pesticides tend to accumulate at the application site.

536
Metabolism of 3-4-dichloroaniline in Soils.

Kearney, P.C.; Plimmer, J.R.; U.S. Department of Agriculture, Beltsville, Maryland

J. Agr. Food Chem., 20(3), 584-585; 1972

TCAB; DICHLOROANILINE; SOILS; CLAY; SILT; TETRACHLOROAZOBENZENE; ISOMERS; METABOLISM; 3,4-DICHLOROANILINE; PESTICIDES

In a silty clay loam the recovery and formation of ^{14}C-3,3(1),4,4(1)-tetrachloroazobenzene (TCAB) increased as the concentration of ^{14}C-3,4-dichloroaniline increased logarithmically. Two isomeric forms of TCAB, probably the cis- and trans- forms, were recovered from soils receiving 1000 ppm; 3,4-dichloroformylanilide was also recovered.

537
Propanil and TCAB Residues in Rice Soils.

Kearney, P.C.; Smith, R.J.; Plimmer, J.R.; U.S. Dep. Agric., Beltsville, MD

Weed Sci. 18, 464-466; 1970

TCAB; TETRACHLOROAZOBENZENE; RICE; SOILS; PROPANIL; PERSISTENCE; RESIDUES

Only low concentrations (less than 0.2 ppm) of TCAB (3,3', 4,4'-tetrachloroazobenzene) were detected, by electron-capture gas chromatography, in the surface 0-10.1 cm layer of rice soils that had received repeated applications of propanil at 6.7 kg/ha. The concentration and occurrence of TCAB decreased with increasing time and soil depth.

538

Cacodylic Acid Metabolism in Soils

Kearney, P.C.; Woolson, E.A.; United States Department of Agriculture, Agricultural Research Service, Plant Science Research Division, Beltsville, Maryland 20705

Paper No. 29, Pesticide Division, 162 National ACS Meeting, Washington, D. C., September 12-17, 1971; 1971

CACODYLIC ACID; METABOLISM; SOILS; ALKYL ARSINES; MICROORGANISMS; DIMETHYL ARSINIC ACID; ARSENATE; PHYTOTOXICITY; AEROBIC; ARSENIC

The following metabolic reactions of cacodylate appears to be significant in soils. Under aerobic conditions microorganisms cleave the C-As bond to form carbon dioxide and arsenate. The arsenate then reacts with the calcium, iron and aluminum salts in soils to form essentially insoluble salts. The iron and aluminum salts exhibit a low order of phytotoxicity. Cacodylic acid also forms these calcium, aluminum and iron salts, the reactions appear to be more significant with the inorganic arsenate. Under reducing conditions, cacodylate forms alkyl arsines. Our work and the work of McBride and Wolfe suggests that the dimethylarsine may be the major evolved product from certain microorganisms. Some of the alkyl arsine generated is trapped directly in soils. This must be a stable complex, since heating the arsine treated soil overnight failed to decrease the C-14 content. The free iron oxides in soils appear to play an important role in this trapping process. It is also well known that dimethylarsine is unstable in air, forming the dimethylarsinoxide or cacodyl oxide. On further air oxidation dimethylarsinoxide is further oxidized to give the dimethylarsinic acid or cacodylic acid. Under aerobic conditions this would undergo C-As bond cleavage. These sequences of events would lend support to the theory of an arsenic cycle in nature as proposed by Frost. Recently we have attempted to trace the fate of several of these organic arsenicals in aquatic food chains involving alga, snails, daphma and fish. We have observed no biomagnification of the labeled arsenicals in these food chains, realizing the limited interpretation one can put on these simple systems.

539

Chemical Distribution and Persistence of C-14-Cacodylic Acid in Soil

Kearney, P.C.; Woolson, E.A.; United States Department of Agriculture, Agricultural Research Service, Plant Science Research Division, Beltsville, Maryland 20705

Paper No. 29, Pesticides Division, 162nd National ACS Meeting, Washington, D. C., September, 1971; 1971

CACODYLIC ACID; HERBICIDES; PESTICIDES; SOILS; DIMETHYL ARSINIC ACID; FLOODED SOILS; METABOLISM; AEROBIC; ARSENIC

The metabolism of cacodylic acid under aerobic conditions appeared to proceed through C-As cleavage as well as through a volatile arsine production. The metabolism of cacodylic acid under anaerobic conditions appeared to proceed through reduction to arsine or dimethylarsine.

540

Persistence and Metabolism of Chlorodioxins in Soils

Kearney, P.C.; Woolson, E.A.; Ellington, C.P.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, MD

Environ. Sci. Technol. (ESTHAG), 6 (12), 1017-19; 1972

PERSISTENCE; METABOLISM; CHLORODIOXIN; SOILS; HERBICIDES; CONTAMINANTS

541

Persistence and Metabolism of Chlorodioxins in Soils

Kearney, P.C.; Woolson, E.A.; Ellington, C.P.; Agric. Environ. Qual. Inst., Agric. Res. Serv., Beltsville, Md.

Environ. Sci. Technol.(ESTHAG) 1972, 6(12) 1017-19; 1972

CHLORODIOXINSS; SOILS; HERBICIDES; DIOXIN; CHLOROPHENOLS; IN VIVO

The persistence of 2,3,7,8-tetrachlorodibenzo-p-dioxin, a contaminate of 2,4,5-t, was determined in soils treated in the laboratory with 1, 10, or 100 ppm 2,3,7,8-tetrachlorodibenzo-p.-dioxin. After 1 year 60% of the originally applied pesticide was recovered. Neither 2,7-dichlorodibenzo-p-dioxin, nor 2,3,7,8-tetrachlorodibenzo-p-dioxin could be detected in soils treated with 2,4-Dichlorophenol or 2,4,5-Trichlorophenol, indicating the absence of in vivo microbial condensation reactions leading to chlorodioxins. A polar metabolite of 2,3,7,8-Tetrachlorodibenzo-p-dioxin was detected.

542

Decay of Parathion and Endosulfan Residues on Field Treated Tobacco South-Carolina 1971

Keil, J.E.; Loadholt, C.B.; Brown, B.L.; Sandifer, S.H.; Sitterly, W.R.

Pestic. Monit. J., 6(1), 1972, 73-75.

INSECTICIDES; DEGRADATION; RAINFALL; TEMPERATURE; PARATHION; ENDOSULFAN; RESIDUES

1147
Persistence of Bidrin in 2 Forest Soils

Werner, R.A.

U.S. Forest Serv. Res. Note Se. 139; 1970

PERSISTENCE; BIDRIN; FORESTS; SOILS; INSECTICIDES; RESIDUES; MOBILITY; CLAY

1148
Interaction of Pesticides with Natural Organic Material

Wershaw, R.L.; Burcar, P.J.; Goldberg, M.C.

Envir. Sci. Tech. 3, 271-273; 1969

PESTICIDES; SODIUM; DDT; WATER; 2,4,5-T; SOLUBILITY; HUMIC ACID; SOIL-WATER INTERACTIONS; SORPTION

Sodium humate strongly solubilized DDT in water and humic acid strongly sorbed 2,4,5-T. These interactions are assumed to represent the types of interaction occurring when any organic pesticide is applied to a soil-water system.

1149
Some Factors Influencing the Persistence of Chlorfenvinphos in Soil

Wheatley, G.A.; Suett, D.L.; Hardman, J.A.; Nat. Vegetable Res. Sta., Wellesbourne, Warwick, England

Part of Fate of Pesticides in Environment, Gordon and Breach, London, (p. 77-85); 1972

LOAM; BIRLAND GRANULES; CHLORFENVINPHOS; CARROTS; RADISHES; PERSISTENCE; RESIDUES; LEACHING; FEN SOILS; CROPS; PLANTS; SOILS; INSECTICIDES

An area of sandy loam soil was rotary-cultivated, and the insecticide, Birland Granules, containing 9.2% chlorfenvinphos, was spread to give 1.85 kg a.i. ha-1. The insecticide was worked into the soil to depths of 0-4 cm or 0-10 cm. Carrots and radishes were sown. Interval soil samples were taken until after the harvesting of the crop. Factors affecting the persistence of chlorfenvinphos were studied. Samples stored for seven days at room temperature averaged a 28% loss of chlorfenvinphos residue. Hexane extracts of treated soil similarly stored suffered no change in chlorfenvinphos concentrations. Results indicate that leaching would not move any significant amount of the insecticide below the maximum depth of cultivation within a season. There was no measurable effect of depth of incorporation of chlorfenvinphos on its subsequent rate of decay. Chlorfenvinphos is relatively persistent in the highly organic fen soils, and care is needed to avoid accumulation of residues under abnormally dry conditions in mineral or fen soils or if crops like carrots are treated too frequently on the same land. This insecticide persists in the soil without change while soil temperatures are below 6-8 degrees degrees C and must be considered when applying the insecticide the following season. The absence of any marked deceleration or acceleration of loss rate in the autumn or spring, respectively, associated with the winter stability, suggests that the primary breakdown of chlorfenvinphos in this soil was biologically dependent. (24 references)

1150
Persistence and Microbiological Effects of Acarol and Chlorobenzilate in Two Florida Soils

Wheeler, W.B.; Rothwell, D.F.; Hubbell, D.H.; Dep. Soil Sci., Univ. Florida, Gainesville, Fla.

J. Environ. Qual.(JEVQAA), 2(1), 115-18; 1973

PERSISTENCE; ACAROL; NITRIFICATION; SOILS; CHLOROBENZILATE; MITICIDE; SAND; ANALYSIS; FUNGI; BACTERIA; ACTINOMYCETES

The influence of the miticides acarol (benzilic acid, 4,4'-dibromo-isopropyl ester) and chlorobenzilate (benzilic acid, 4,4'-dichloro-ehtyl ester) on nitrification capacity and relative microbial numbers in lakeland and leon fine sands was determined. Since chlorobenzilate is now used commercially and a porposal is pending for the registration and sale of acarol, it is important to assess the effects of these materials on soil microbial populations. The miticides were applied to both soils at rates of 0, 0.25, 0.50, and 1.0 ppm incubated in the laboratory for 16 weeks, and sampled for analysis at periodic intervals. Neither chemical influenced the nitrification capacity of either soil or the numbers of fungi, bacteria, and actinomycetes. Acarol was more persistent than chlorobenzilate; both chemicals remained at higher levels for longer periods of time in leon soil than in lakeland soil. The miticides had finite rates of disappearance from both soils.

1151
Pesticides in the Environment

White-Stevens, R.

Marcel Dekker, Inc., New York, 1(2), 629; 1971

PESTICIDES

1152
Pesticides in the Environment

White-Stevens, R.

Marcel Dekker, Inc., New York, 1(1), 144; 1971

PESTICIDES; FUNGICIDES; HERBICIDES

1153
The Influence of Moisture, Temperature and Soil Properties on the Disappearance of Lindane and Dieldrin from Soil

White, A.W.

Dissertation Abstr. Intern., 30(12, Pt. 1), 5327B-8B; 1970

MOISTURE; TEMPERATURE; LINDANE; DIELDRIN; SOILS

1154
Thermal and Basecatalyzed Hydrolysis Products of the Systemic Fungicide Benomyl

White, E.R.; Bose, E.A.; Ogawa, J.M.; Manji, B.T.; Kilgore, W.W.; Dept. of Environ. Toxicol., Univ. of California, Davis, CA 95616

J. Agr. Food Chem., 21(4), 616-618; 1973

FUNGICIDES; DEGRADATION; HYDROLYSIS; BENOMYL; FATE; HYDROLYSIS PRODUCTS

The chemical fate of benomyl fungicide in practical use situations was investigated and is described. Conversion products were isolated, purified, and subsequently subjected to a number of spectroscopic techniques appropriate for structural characterization. Synthesis routes for obtaining otherwise unavailable reference standards of hydrolysis products are described and a degradative pathway of benomyl to these conversion products is proposed. (7 references)

1155
Role of Soil Colloids in the Behavior and Fate of Pesticides in Soils

White, J.L.; Cruz, M.; Dep. Agron., Purdue Univ., Lafayette, In

Pestic. Chem., Proc. Int. Congr. Pestic. Chem., 2nd(24WAAY) 1972, 6, 23-45; 1972

PESTICIDES; ADSORPTION; SOIL COLLOIDS; CHEMISORPTION; DEGRADATION; SOILS; ORGANIC MATTER; ALUMINOSILICATE; DETOXIFICATION; DESORPTION; VOLATILIZATION; CHLOROTRIAZINES; AMITROLE; HYDROXYTRIAZINE; MONTMORILLONITE; VERMICULITE; METHOXYTRIAZINE; PROMETONE; METHYLTHIOTRIAZINE; PROMETRYNE; PROPAZINE; PROTONATION; HYDROXYTRIAZINE; EXTRACTION; MECHANISM; WATER; PH; CLAY; FATE

Pesticide-soil interaction is greatly influenced by the colloidal properties of soil particles. Various spectroscopic studies of surface reaction mechanisms between organic molecules and aluminosilicate minerals suggest mechanisms involved in adsorption, degradation, and detoxification of pesticides by soil components. Infrared studies suggest that pesticide molecules and water molecules competing for adsorption sites may explain losses by desorption and volatilization. In the acid environment of clay surfaces certain pesticides such as the chlorotriazines are subject to reactions that the organic cations of amitrole are not. The chlorotriazine are hydrolyzed to produce the protonated hydroxytriazine. In soils rich in montmorillonite or vermiculite this protonated hydroxytriazine is strongly held and the amount of s-triazine and its degradation product in the soil water will be reduced. The methoxytriazine (prometone) and methylthiotriazine (prometryne) are more readily protonated upon adsorption on montmorillonite than the chlorotriazine (propazine). Failure to acknowledge this protonated hydroxytriazine state makes extraction procedures to remove triazines and their degradation products from the soil very difficult. (37 references)

1156
Pesticide Retention by Clay Minerals

White, J.L.; Mortland, M.M.

Part of Pesticides in the Soil: Ecology, Degradation, and Movement, Mich. State Univ., E. Lansing, Mich., p. 95-100; 1970

PESTICIDES; RETENTION; CLAY MINERALS; DEGRADATION; MOVEMENT; CLAY

1157
Persistent Insecticides Protectors of Health and Environmental Pollutants

WHO; World Health Organization

W.H.O. (World Health Organ.) Chron, 25(5), 206-208; 1971

DDT; PERSISTENCE; INSECTICIDES

1158
National Soils Monitoring Program, 6 States, 1967

Wiersma, G.B.; Sand, P.F.; Schutzmann, R.L.

Pestic. Monit. J., 5(2), 1971, 223-227

DIELDRIN; CHLORDANE; DDT; DDD; DDE; PESTICIDES; DISTRIBUTION; CROPLAND

1159
Pesticide Residues in Soil from 8 Cities 1969

Wiersma, G.B.; Tai, H.; Sand, P.F.; Pesticides Regulation Division, EPA, Washington, DC 20460

Pestic. Monit. J., 6(2), 126-129

DDT; DIELDRIN; CHLORDANE; HEPTACHLOR; ENDRIN; TOXAPHENE; PESTICIDES; RESIDUES; SOILS; METABOLITES; DDTR; HEPTACHLOR EPOXIDE

Soil samples from eight cities were analyzed for pesticide residues. Besides DDT and its metabolites (DDTR), other pesticides detected were dieldrin, chlordane, heptachlor, heptachlor epoxide, toxaphene, and endrin. No organophosphate residues were detected. Levels of DDTR varied significantly among the eight cities, with the highest average residue level in Miami, Fla. (5.98 ppm) and the lowest in Houston, Tex. (0.35 ppm). When residue levels in lawn or garden areas were compared to those in unkept areas within the cities, DDTR residues were significantly greater for lawn areas.

1160
Pesticide Residue Levels in Soils, Fiscal Year 1969. National Soils Monitoring Program

Wiersma, G.B.; Tai, H.; Sand, P.F.; Off. Pestic. Programs, Environ. Prot. Agency, Washington, D. C.

Pestic. Monit. J.(PEMJAA), 6(3), 194-228; 1972

INSECTICIDES; SOILS; HERBICIDES; PESTICIDES; RESIDUES; MONITORING

1161
Degradation and Synthesis of Chloroneb by Soil Microorganisms

Wiese, M.V.; Vargas, J.M.

Phytopathology, 62(10), 1112; 1972

DEGRADATION; CHLORONEB; MICROORGANISMS; FUNGICIDES; SOILS

1162
Inter Conversion of Chloroneb and 2,5-Dichloro-4-Methoxy Phenol by Soil Microorganisms

Wiese, M.V.; Vargas, J.M.

Pest Biochem. Physiol., 3(2), 214-222; 1973

FUNGICIDES; STABILITY; METHYLATE; DEGRADATION; SOILS; CHLORONEB; PHENOL; MICROORGANISMS; 2,5-DICHLORO-4-METHOXY PHENOC

1163
Interconversion of Chloroneb and 2,5-Dichloro-4-Methyoxyphenol by Soil Microorganisms

Wiese, M.V.; Vargas, J.M.; Dep. Bot. Plant Pathol., Michigan State Univ., East Lansing, Mi

Pestic. Biochem. Physiol.(PCBPBS), 3(2), 214-22; 1973

CHLORONEB; DEGRADATION; SYNTHESIS; SOILS; MICROBES; CHLOROMETHOXYPHENOL; INTERCONVERSION; FUNGI; IN VITRO; METHYLATION; DESYNTHESIS; METABOLISM

Of 23 soil microorganisms tested, 13, and especially FUSARIUM SOLANI, demethylated up to 50% of the available fungicide chloroneb (0.5 micrograms/ml) to its principle degradation product 2,5-dichloro-4-methoxyphenol, whereas 8, especially TRICHODERMA VIRIDE and MUCOR RAMANNIANUS, converted up to 20% of the available 2,5-dichloro-4-methoxyphenol (0.5 micrograms/ml) to chloroneb in vitro. CEPHALOSPORIUM GAMINEUM, RHIZOCTONIA SOLANI, M. RAMANNIANUS, and F. SOLANI fungi could both methylate and demethylate 2,5-dichloro-4-methoxyphenol to produce chloroneb and 2,5-dichlorohydroquinone, respectively. Both degradation and resynthesis of chloroneb coincided with periods of active microbial growth and metabolism. Thus, the interconversion of chloroneb and 2,5-dichloro-4-methoxyphenol by soil microorganisms may be biochemically mediated, and contribute to the relative stability and long term effectiveness of chloroneb in the soil.

1164
Toxic Residues in Soil 9 Years After Treatment with Aldrin and Heptachlor

Wilkinson, A.T.S.

Science, 143, 681-682; 1964

RESIDUES; TREATMENT; ALDRIN; HEPTACHLOR; SOILS; PERSISTENCE

1165
Vermiculite and Activated Carbon Adsorbents Protect Direct Seeded Tomatoes-D from Partially Selective Herbicides

William, R.D.; Romanowski, R.R.

J. Am. Soc. Hortic. Sci., 97(2), 245-249; 1972

NITRALIN; WEEDS; SOIL CRUSTING; VERMICULITE; ADSORPTION; TOMATOES; HERBICIDES; SEEDS

1166
Determination of Residues of Fensulfothion and Its Sulfone in Muck Soil

Williams, I.H.; Brown, M.J.; Finlayson, D.G.; Canada Department of Agriculture, Vancouver 8, Canada

J. of Agric. & Food Chem., 20(6), 1219-1221; 1972

FENSULFOTHION; SULFONE; MUCK; SOILS; SOIL MOISTURE; EXTRACTION; RESIDUES

In the method described fensulfothion and its sulfone were extracted from muck soils using an 8 h Soxhlet extraction with a 9:1 chloroform-ethanol mixture. Cleanup and fractionation was on an alumina-silica gel column and determination was by gas chromatography with flamephotometric detection. Optimum recoveries were obtained at 20-60% soil moisture content. Recoveries from soils fortified at 0.1, 1.0 and 10 ppm were 80% or greater.

1167
Herbicides-Their Fate and Persistence in Soils

Williams, J.H.

Gt. Brit. Nat. Agr. Adv. Ser. Quart. Rev., 87, 119-31; 1970

BREAKDOWN; PERSISTENCE; SOILS; HERBICIDES; ADSORPTION; VOLATILIZATION; WEEDKILLERS; UPTAKE; PLANTS; 2,4-D; MCPA; SIMAZINE; DIURON; LINURON; CHLOROXURON; AMITROLE; DALAPON; DICHLOBENIL; CHLORTHIAMID; PARAQUAT; REVIEW; LEACHING

Some of the presently known facts about the breakdown and persistence of herbicidal chemicals in soils are reviewed. The persistence of growth regulators and soil-acting herbicides has been studied by various investigators. The results of some of these studies are summarized in this paper. Herbicides in the soil may breakdown under the influence of microbial action. ultraviolet radiation or chemical hydrolysis. The factors affecting breakdown and persistence include adsorption of the herbicide in the soil, volatization of the weedkiller from the soil surface as well as compound solubility and leachability and uptake of the herbicide by plants. These factors, as well as the persistence of growth regulating herbicides including 2,4-D and MCPA, soil-acting herbicides such as simazine, diuron, linuron, chloroxuron, amitrole, dalapon, dichlobenil, chlorthiamid and a foliar-applied herbicide, paraquat, are discussed. (42 references)

1168
Agricultural Chemicals in Surface Runoff, Ground Water, and Soil. I. Endrin

Willis, G.H.; Hamilton, R.A.; Agric. Res. Serv., Baton Rouge, La.

J. Environ. Qual. (JEVQAA), 2(4), 463-6; 1973

SOILS; WATER; ENDRIN; INSECTICIDES; SUGARCANE; RUNOFF

Endrin (0.337 KG/HA) was surface-applied to sugarcane (SACCHARUM OFFICINARUM). Runoff, ground space water and soil were analyzed for endrin over 2 years. Only less than 0.2% endrin were lost annually in runoff, and little endrin accumulated in soil. Trace amounts of endrin moved through soil. In the ground water endrin was less than 1 ppb. Less endrin was present in the runoff, ground water and soil when time between application and rainfall was 72 hours as compared to 24 hours.

1169
Pesticides in Air Volatilization of Soil Applied DDT and DDD from Flooded and Nonflooded Plots

Willis, G.H.; Parr, J.F.; Smith, S.

Pestic. Monit. J., 4(4), 204-208; 1971

PESTICIDES; AIR; DDT; DDD; CLIMATE; VOLATILIZATION; FLOODING

1170
Volatilization of Dieldrin from Fallow Soil as Affected by Different Soil Water Regimes

Willis, G.H.; Parr, J.F.; Smith, S.; Carroll, B.R.; Soil And Water Conserv. Res. Div., Agric. Res. Serv., Baton Rouge, La.

J. Environ. Qual. (JEVQAA), 1(2), 193-6; 1972

DIELDRIN; VOLATILIZATION; SOILS; MOISTURE; INSECTICIDES

Five months after application of 10 ppm dieldrin to soil, 2,18, and 7% was volatilized from flooded, moist (SPRINKLED), and nonflooded (NO WATER APPLIED OTHER THAN NATURAL RAINFALL) plots, respectively. Temperature had the greatest effect on dieldrin volatilization of the climatic variables measured. There was no apparent dieldrin degradation in any of the plots.

1171
Environmental Effects on Absorption and Translocation of 2,4,5-Tri Chlorophenoxy Acetic-Acid in Winged Elm-D

Wills, G.D.; Basler, E.

Weed Sci, 19(4), 431-434; 1971

LEAVES; BARK; STEMS; ROOTS; HERBICIDES; LIQUID SCINTILLATION; AUTORADIOGRAPHY; SEASON; AIR; TEMPERATURE; SOILS; MOISTURE; ELM; ABSORPTION; TRANSLOCATION; 2,4,5-T; WINGED ELM

1172
Fate of Pesticides in the Environment - A Progress Report

Wilson, B.R.

Trans. N.Y. Acad. Sci., 28(6), 694-705; 1966

FATE; PESTICIDES

1173
Persistence and Movement of Alpha- and Gamma-chlordane in Soils Following Treatment with High-Purity Chlordane (Velsicol HCS-3260)

Wilson, D.M.; Cloffs, P.C.

Canadian J. of Soil Science, 53(4), 456-472; 1973, November

LEACHING; RAINFALL; HALF-LIFE; RESIDUES; SOIL MOISTURE; VELSICOL HCS-3260; PESTICIDES; PERSISTENCE; MOVEMENT; SOILS; CHLORDANE

Residues from high-purity chlordane (Velsicol HCS-3260) were determined in British Columbia soils for 16 months following applications in June 1971 at two rates of 5.6 and 11.2 kg active ingredients (a.i.)/ha. Residues from a cool, moist location declined rapidly during the first month following application, with greater percentage loss from the lower application rate. From the second month until 16 month after application, decay rates were linear with time. Although 225 cm rain fell during this period, less than 2% of the total residues reached the 15-23-cm horizon. Calculated half-lives were 4 and 11 months, respectively. Residues from a semiarid location were more persistent and did not decline rapidly within the first month after application. Possible reasons for these differences are discussed. Leaching experiments with five different soil types in the laboratory confirmed the limited movement of chlordane observed in field soil.

1174
Persistence and Degradation of Dieldrin and Heptachlor in Soil and Effects of Plants

Wingo, C.W.

Univ. Missouri Research Bulletin No. 91

PERSISTENCE; DEGRADATION; DIELDRIN; HEPTACHLOR; PLANTS; SOILS

1175
Aldrin, Dieldrin, Endrin, and Chlordane Persistence - A 3-Year Study

Winnett, [illegible].; Reed, J.P.

Pest. Monit. J., 2(3), 133-6; 1968

ALDRIN; DIELDRIN; ENDRIN; CHLORDANE; PERSISTENCE

1176
Global Aspects of Pesticide Residue Problems

Winteringham, F.P.; Food Agric. Organ. United Nations, Iaea, Vienna, Austria

Isr. J. Entomol.(IJENB9), 6(2), 171-81; 1971

REVIEW; ENVIRONMENTAL; PESTICIDES; RESIDUES

1177
Persistence of Parathion in Soil

Wolfe, H.R.; Staiff, D.C.; Armstrong, J.F.; Comer, S.W.; Perrine Primate Lab., Environ. Prot. Agency, Wenatchee, Wa

Bull. Environ. Contam. Toxicol.((BECTA6), 10(1), 1-9; 1973

PARATHION; PERSISTENCE; SOILS; MICROFLORA; INSECTICIDES; BACTERIA; MAMMALS; SPILLAGE; RESISTANCE

Parathion persisted in the soil at relatively high levels for 5 years following gross topical contamination with a 45.6% emulsifiable concentrate formulation. Soil level decreased from an initial level of 30,000-55,000 ppm parathion to 13,800 ppm parathion in the top 1 inch of soil over the 5 year period. At the end of 6 years very little parathion was found below the 9 inch level. The number of colonies of soil bacteria from parathion-treated soil was lower than from untreated soil, and no resistance to parathion was observed over a 2 year period. Parathion can persist in the soil up to 16 years, and soil contamination by spillage must be given attention in view of its high toxicity to mammals.

1178
Metabolism of Fungicides and Nematocides in Soils

Woodcock, D.; Res. Stn., Univ. Bristol, Long Ashton/Bristol, England

Soil Biochem.(17BSAB), 2, 337-60; 1971

REVIEW; SOILS; PESTICIDES; DEGRADATION; NEMATOCIDES; FUNGICIDES

1179
Total Toxic Aldicarb Residues in Soil, Cottonseed, and Cotton Lint Following a Soil Treatment with the Insecticide on the Texas High Plains

Woodham, D.W.; Edwards, R.R.; Reeves, R.G.; Schutzman, R.L.; U.S. Department of Agriculture Animal and Plant Health Inspection Service, Plant Protection Program, Brownsville, TX 78520

J. Agr. Food Chem., 21(2), 303-307; 1973

ANALYSIS; PESTICIDES; SOILS; ADSORPTION; ALDICARB; RESIDUES; COTTONSEED; COTTON LINT; PERSISTENCE; SULPHONE; IRRIGATION

Aldicarb 10G at 15 lb/acre (1.5 lb of active ingredient) was applied at the side of rows of seedlings on sandy loam soil. In non-irrigated fields, aldicarb residues (as the sulphone) in the row soil averaged 1.65 ppm three days after application and 0.24 ppm after a month, and completely disappeared in four months. In irrigated fields, the residues in row soil averaged 0.7 ppm 13 days after application and disappeared completely in 42 days. No significant residues occurred in soil between treated rows or in adjacent untreated fields.

1180
Persistence and Reactions of (14C)-Cacodylic Acid in Soils

Woolson, E.A.; Kearney, P.C.; Agric. Res. Cent., Agric. Res. Serv., Beltsville, Md.

Environ. Sci. Technol.(ESTHAG) 1973, 7(1) 47-50; 1973

CACODYLIC ACID; SOILS; HERBICIDES; DEGRADATION

When 1-100 ppm 14c-labeled cacodylic acid was incorporated into 3 soils, the concentration of cacodylic acid was the highest in the water-soluble fraction, followed in decreasing order by the Al, Fe, and Ca fractions. Inorganic arsenate accumulated mostly in the Fe and Al fractions. Cacodylic acid persistence was a function of soil type. Cacodylic acid was decomposed into a volatile alkylarsine, under both anaerobic and aerobic conditions. Degradation under aerobic conditions also occurred by cleavage of the C-As bond, presumably yielding CO2 and AsO43.

1181
Microbial Degradation of 4 Carboxy-1-Methyl Pyridinium Chloride a Photolytic Product of Paraquat

Wright, K.A.; Cain, R.B.

Biochem. J., 118(3), 52-53; 1970

DEGRADATION; PHOTOLYSIS; PARAQUAT; PESTICIDES;

1182

Degradation of Herbicides by Soil Micro-Organisms

Wright, S.J.L.; School Biol. Sci., Bath, Somerset, England

Soc. Appl. Bacteriol. Symp. Ser. 1, 233-254; 1971

BIODEGRADATION; ENZYME; PHENOXYALKANOATES; ANILINE; MICROORGANISMS; OXIDATION; PHENYLCARBAMATES; PHENYLUREA; HYDROLYTIC DECHLORINATION; METABOLISM; CHLORINATED ALIPHATIC ACIDS; BENZOATES; TRIAZINE; PARAQUAT; DIQUAT

For a pesticide to be subject to biodegradation, organisms effective in metabolizing the compound must exist in the soil or be capable of developing there, be in a degradable form, reach the organisms, and induce the formation of enzymes necessary for degradation. Conditions in the environment must favor the proliferation of the organisms and operations of the enzymes. Evidence of microbial degradation has been obtained for most of the herbicides. Phenoxyalkanoates can be degraded by beta-oxidation of compounds with long fatty acid moieties, cleavage of the ether link between the side chain and the aromatic ring, and ring hydroxylation prior to attack on the side chain. The formation of nonphytotoxic anilines from phenylcarbamates is apparently a process widely distributed among soil microbes. Detoxication of phenylurea compounds also takes place in soil, and anilines are formed in the process. Hydrolytic dechlorination is the first step in the metabolism of chlorinated aliphatic acids. Substituted benzoates and triazine compounds are quite resistant to attack. Several organisms have been isolated which degrade paraquat and diquat, but these chemicals are strongly adsorbed by some soil particles and are thus unavailable to biological systems. Much of the work on degradation of herbicides has been done with isolated organisms and pure chemicals. This needs to be extended with conditions more closely resembling those found in the field.

1183

Microbiological Aspects of the Breakdown of Herbicides in the Environment

Wright, S.J.L.; School Biol. Sci., Univ. Bath, Bath, Somerset, England

J. Appl. Chem. Biotechnol., 22(7), 880-881; 1972

PERSISTENCE; HERBICIDES; PHENYLCARBAMATES; PHENOXYALKANOATES; TRIAZINE; BENZOATES; DEGRADATION; PHENYLANILIDES; CHLOROANILINES; CHLOROAZOBENZENES; BREAKDOWN; SOILS; MICROORGANISMS; USAGE

The persistence of herbicides varies and ranges from several weeks for phenylcarbamates and phenoxyalkanoates to many months for triazines and substituted benzoates. A dearth of information concerning the complex field situation is apparent although degradation of herbicides by isolated organisms has been studied extensively. Phenylcarbamates and phenylanilides are generally inactivated by the formatic of aniline compounds, but the persistence and toxicity of some chloroanilines and chloroazobenzenes suggests that these residues should be carefully monitored in soil. Practical uses, such as antidotal application of microbial preparations on spillage of herbicides, have resulted from investigation of the breakdown of these chemicals in the soil.

1184

Metabolism of the Herbicide Barban by a Soil Penicillium

Wright, S.J.L.; Forey, A.

Soil Biol. Biochem., 4(2), 207-213; 1972

3 CHLOROANILINE; AMIDASE; HERBICIDES; SOILS; METABOLISM; BARBAN

1185

Characteristics of Mineral Diluents Affecting the Decomposition of Sumithion in Dust Formulations

Wuh, K.D.; Han, S.S.; Keum, S.S.; Ahn, S.H.; Lee, C.M.; Inst. Plant Environ., Off. Rural Dev., Suwon, S. Korea

Han'Guk Sikmul Poho Hakhoe Chi(HSHCA8), 10(2), 77-83; 1971

SUMITHION; DECOMPOSITION; DILUTION; INSECTICIDES; BENTONITE; DIATOMACEOUS EARTH; KAOLIN; TALC

During a study of the effects of mineral diluents on the decomposition of sumithion in dust formulations. Sumithion decomposition was higher in the order bentonite greater than diatomaceous earth greater than kaolin greater than talc. Sumithion decomposition products were identified as dimethylphosphorothionate, 3-methyl-4-nitrophenol, and derivitives of the latter. The degree of sumithion decomposition was correlated with the total bass and water content of the diluents.

1186

Aldrin and Dieldrin

Wurster, C.F.

Environment, 13(8), 33-45; 1971

HYDROCARBONS; INSECTICIDES; REVIEW; RESIDUES; MOBILITY; AIR; WATER; PERSISTENCE; SOLUBILITY; VERTEBRATES; DDT; MORTALITY; FISH; WILDLIFE; SUBLETHAL; BIRDS; HUMANS

A review of two persistent hydrocarbon insecticides, aldrin and dieldrin, is presented. Since aldrin is converted into dieldrin in the environment, application of either compound yields residues of dieldrin, the ultimate environmental contaminant. The specific properties of these two chemicals are considered under the categories of: motility (they enter the air and surface waters and are dispersed over great distances); persistence (dieldrin is one of the most stable of all insecticides and its residues remain active in the environment for many years); solubility characteristics (more soluble in living tissues than in water); and biological activity (toxic to vertebrates, more toxic than DDT). Mortality to fish and wildlife has been spectacular. Sublethal effects on nontarget organisms have resulted in changes in normal growth or behavior patterns and effects on reproduction. Other effects on birds, fish, and organisms are described. Behavioral effects on humans have also been studied in workers exposed to these insecticides. Carcinogenic effects and enzyme induction are believed to occur in humans. (144 references)

1187
Naptalam Estimation in Cranberry-E Bog Soil

Yaklich, R.W.; Demoranville, I.E.; Devlin, R.M.

Proc. Northeast Weed Sci. Soc., 26, 293-296; 1972

HERBICIDES; PERSISTENCE; BREAKDOWN; SOILS; NAPTALAM; BOG; CRANBERRY BOG

1188
Persistence of Organochlorine Pesticides in Soil and Crops 1. Absorption and Translocation of Aldrin and Dieldrin in Strawberries

Yamaberi, M.; Yano, H.; Shinmyo, N.; Kagawa Agric. Exp. Stn., Takamatsu, Japan

Kagawa-Ken Nogyoshikenjo Kenkyu Hokohi (KNKHA2), (22), 36-42; 1972

ADRIN; DIELDRIN; RESIDUES; STRAWBERRIES; INSECTICIDES; PERSISTENCE; SOILS; CROPS; RATE; BERRIES; ORGANOCHLORINE PESTICIDES

Aldrin and dieldrin residues were determined in strawberries 75 and 110 days following a soil application of aldrin (0.3-100 ppm). Berry residues were less than 0.001 ppm aldrin and less than 0.003 ppm dieldrin after 110 days in an area in which aldrin had been used over a 3 year period. Aldrin to dieldrin conversion rates are given.

1189
Adsorption of Ametryne and Atrazine on an Oxisol Montmorillonite and Charcoal in Relation to pH and Solubility Effects

Yamane, V.K.; Green, R.E.; Hawaii University, Honolulu, Hawaii

Soil Sci. Soc. Am. Proc., 36(1), 58-64; 1972

HERBICIDES; SOILS; ADSORPTION; AMETRYNE; ATRAZINE; MONTMORILLONITE; CHARCOAL; PH; SOLUBILITY; PROTONATION; OXISOL

Ametryne was adsorbed to a greater extent than atrazine on soil and montmorillonite at low and high pH. Ametryne showed a greater increase in adsorption with decrease in pH (PKA approximately equal to 4.0) than atrazine (PKA = 1.68). Addition of charcoal masked the pH effect of ametryne adsorption. Adsorption of ametryne on charcoal decreased at the low ph values conducive to ametryne protonation. There was higher adsorption of both ametryne and atrazine at 25 than 10 degrees C. A wetting agent in commercial ametryne had no effect on adsorption.

1190
Interaction of Dipyridylium Herbicides and Soil Micro-Organisms

Yang, J.S.; Funderburk, H.H.; Curl, E.A.; Auburn Univ., Ala.

Abstr. Meet. Weed Sci. Soc. Am., 38; 1968

DIPYRIDYLIUM HERBICIDES; DIQUAT; PARAQUAT; HERBICIDES; MICROORGANISMS; YEASTS; SOILS; DEGRADATION; ENZYME

Several species of soil micro-organisms were tolerant to 5000 ppm diquat and some species degraded it. Diquat and paraquat were degraded enzymatically by the soil yeast LIPOMYCES STARKEYI.

1191
Influence of Water and Temperature on Adsorption of Parathion by Soils

Yaron, B.; Saltzman, S.; Volcani Center, Bet Dagan, Israel

Soil Sci. Soc. Am. Proc., 36(4), 538-586; 1972

INSECTICIDES; CARBON 14; WATER; TEMPERATURE; ADSORPTION; PARATHION; SOILS; TRACER

Corrected adsorption isotherms of carbon 14-tagged parathion showed that parathion was adsorbed without any appreciable thermal effect. Normal adsorption isotherms showed parathion adsorption decreased with an increase in temperature. Adsorption generally decreased with an increase in soil water. In aqueous soil suspensions parathion adsorption decreased as the temperature increased. In soil-hexane-parathion systems adsorption equilibria were similar at 10 and 30 degrees C and adsorption increased at 50 degrees C.

1192
Transformations of the Herbicide N-1, 1-Di-Methylpropynyl-3 5-Dichloro Benzamide in Soil

Yih, R.Y.; Swithenbank, C.; McRae, D.H.; Rohm & Haas Research Lab., Spring House, Pa

Weed Sci., 18(5), 604-607; 1970

TEMPERATURE; SOILS; DICHLOROBENZAMIDE; DICHLOROPHENYL; RH-315; KERB; CYCLING; 2-(3,5-DICHLOROPHENYL)-4,4-DIMETHYL-5-METHYLENEOXAZOLINE; HYDROLYSIS; N-(1,1-DIMETHYLACETONYL)-3,5-DICHLOROBENZAMIDE; LOAM; TRANSFORMATION; CLAY; SAND

The compound (formerly designated as RH-315, now called Kerb) was readily transformed, by initial cyclization into (A) 2-(3,5-dichlorophenyl)-4,4-dimethyl-5-methyleneoxazoline, and subsequent hydrolysis into (B) N-(1,1-dimethylacetonyl)-3,5-dichlorobenzamide. Rates of cyclization and hydrolysis were high at high temperature (37 degrees C) and very low at low temperature (5 degrees C); conversion rates were similar at 14% and 22% moisture levels. Transformation of kerb (34 days after treatment at 26 degrees C) occurred in 5 of 6 soil types (ranging from loam, and silty clay loam to clay and sand).

1193

Degradation of Gamma BHC in Rice Soils

Yoshida, T.; Castro, T.F.; Int. Rice Res. Inst., Los Banos, Laguna, Philippines

Proc. Soil Sci. Soc. Am., 34, 440-442

DEGRADATION; SOILS; HEXACHLOROBENZENE; LINDANE; BHC; INSECTICIDES; ORGANIC MATTER; DECOMPOSITION; TEMPERATURE; FLOODING; RICE

Degradation of the insecti[illegible]de in different rice soils (pH 4.7-7.6, organ[illegible]atter 1.5-4.4%) was rapid under flooded conditions, and its rate of decomposition was directly related to organic-matter level. Rate of gamma-BHC degradation was increased by increasing temperature, and retarded by NO2 as well as by NO3 and MnO2.

1194

Diagnosis of Environment Seen from Soil-Pollution. The Present State of Soil Pollution by Heavy Metals and Pesticides

Yoshiike, A.; Section of Soil and Pesticides for Agriculture, the Environment Agency of the Japanese Government, Tokyo, Japan

Kankyo Sozo (Environ. Creation), 4(1), 84-89; 1974

ORGANOCHLORINE INSECTICIDES; SOILS; AGRICULTURE; METALS; TRACE ELEMENTS; BENZENE HEXACHLORIDE; CROPS; PESTICIDES; POTATOES; CUCUMBERS; ALDRIN; DIELDRIN; ENDRIN; REGULATION; BHC; DDT

The present state of soil pollution in Japan is outlined. Soil pollution by pesticides used for agricultural uses is attributed to persistent, not-easily decomposed organochlorine insecticides. These pollute the field soil, are absorbed by the crops and in turn pollute the agricultural produce. Instances of crop-pollution through polluted soil are potatoes and cucumbers produced in eight prefectures and containing aldrin, dieldrin, and/or endrin more than the standard value in 1970. Countermeasures for soil pollution by pesticides include the regulation of pesticides with severe restrictions on the use of aldrin and dieldrin and prohibition of the use of BHC and DDT. Pesticides applying for registration will be held back if they are persistent and pollute the soil. Fields polluted by persistent pesticides are not recommended for planting of vegetable crops such as cucumber and Japanese radish, but can be used for growing ornamental plants.

1195

Effects on Groundwater

Young, R.H.F.

J. Water Pollut. Contr. Fed., 44(6), 1208-1211; 1972

GROUNDWATER; PESTICIDES; SHEEP DIP; LAND; STREAMS; LAKES; ALGAL BLOOMS; WATER; RESIDUES; LEACHING; HERBICIDES; FERTILIZERS; SOIL; GROUND WATERS

Contamination of groundwater by pesticides has been reported several times. Sheep dip, discharged on land, was transported through a storage aquifer into a feeder stream of a lake. The subsequent depression of DAPHNIA, BOSMINIA, and CHIRONOMIDS resulting in algal blooms made the lake temporarily unsuitable as a water source. Backfill of a well with groundwater from a site previously used for flushing DDT and toxaphene sprayers resulted in a gradual increase in residues of these insecticides in the well water. Irrigation application rates and frequency and soil properties affected the leaching of herbicides and fertilizers into groundwater in Hawaii. Movement of other contaminats in soil has also been reported. (26 references)

1196

DDT Residues in Forest Soils.

Yule, W.N.; Chem. Control Res. Inst., Can. For. Serv., Ottawa, Ontario, Canada

Bull. Envl. Contam. Toxicol., 5, 139-144; 1970

DDT; DISTRIBUTION; FOREST SOILS; LITTER; SOILS; PERSISTENCE; RESIDUES

A preliminary report on forms, amounts and distribution of DDT in the forest soils of New Brunswick, and results of toxicological tests with these soils. Although DDT persisted in study plots mainly in the form of the most toxic isomer (pp DDT) in considerable quantities (11 oz/acre), and mostly in the litter layer, the direct toxic effects of these residues were greatly attenuated by the soil itself. Consequently, their direct ecological significance is very much less than chemical analysis alone might indicate.

1197

Intensive Studies of DDT Residues in Forest Soil

Yule, W.N.; Dep. Environ., Can. For. Serv., Ottawa, Ontario, Canada

Bull. Environ. Contam. Toxicol.(BECTA6), 9(1) 57-64; 1973

DDT; RESIDUES; FOREST SOILS; SOILS

Summary of intensive studies on the vertical and horizontal distributions of DDT in the forest soil environment at Priceville, and traces qualitative and quantitative changes that have occurred in soil residue status between 1967 and 1971.

1198
Contamination of Drinking Water Sources with Solid Refuse

Zamfir, G.; Nestase, V.

Gig. Sanit., 36(12), 80-81; 1971

PESTICIDES; FLOODPLAIN; WATER; DIBUTOX; DINOSEB: ORGANOPHOSPHORUS PESTICIDES; DETOX; DUPLITOX; HEKLOTOX; ALDRIN; EKATOX; ORGANOCHLORINE PESTICIDES; CREEK; CHEMICAL PLANT; FISH DEATHS; REVIEW; FISH; GROUNDWATER; WELL WATER; GROUND WATER

Cases of well, ground and river water contamination by pesticides and other chemicals in Rumania are reviewed. Nearly 100 wells in a floodplan were poisoned over two years by contaminated water discharged after washing dibutox (dinoseb) pesticide containers. Concentrations of 0.1 to 2.0 mg/l were measured. The communal water supply of a city was poisoned by large amounts of organochlorine and organophosphorus pesticides (detox, duplitox, heklotox, aldrin, and ekatox) due to a violation of the rules of residue discharge. Organochlorine pesticide concentrations in the order of 10 mg/l were measured in the water of a creek near a chemical plant. Massive fish deaths in pesticide contaminated creeks were reported.

1199
Carbaryl Degradation by PSEUDOMONAS-PHASEOLICOLA and ASPERGILLUS-NIGER

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Pak. J. Sci. Ind. Res., 14(4-5), 1971, 383-384

CARBARYL DEGRADATION; INSECTICIDES

1200
Studies on the Bio Degradation of Parathion

Zuckerman, B.M.; Deubert, K.H.; Mackiewicz, M.; Gunner, H.

Plant Soil, 33(2), 1970, 273-281

VINEGAR; FLY; AMINOPARATHION; CHOLIN; ESTERASE; INSECTICIDES

1201
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Rocz. Glebozn. (ROGLAA), 22(1), 124-136; 1971

SIMAZINE; SOILS; DEGRADATION; PERSISTENCE; RIVER SAND; BLACK EARTH; ALLUVIAL SOIL

River sand, alluvial soil, and black earth, mixed with simazine showed after 10 weeks 70, 20 and 10%, respectively, of the initial simazine content.

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